# COMPUTERWORLD

## Amdahl alerts customers to defective disk drives

Company reports high failure rates for 6380 K

#### BY JEAN S. BOZMAN

SUNNYVALE, Calif. - Amdahl rp. acknowledged last week at there are defects in its 6380 del K disk drive and said 100 customers need to install

per 1991. The 7.5G-byte es, designed by Amdahl engi-is, were made at a Fujitsu sputer Products of America, factory in Hillsboro, Ore., inhlered

# **DEC. Microsoft tighten ties**

forms," said Richard L. Krobe, manager of technology architec-ture at London Life Insurance Co. in London, Ontario. "We are a big user of DEC equipment for our middle-tier

server platform wit 3.0, giving Windows access to a variety including CCITT X.

# Citicorp overhauls corporate network

BY JOANIE M. WEXLER

year in telecommunic costs by 1993. The effort is part of a m

to slash corporatewide annual operating expenses by \$1.5 bil-lion by 1993 at the belenguered \$225 billion bank holding compa-

# PC buyers hold out for more

Hardware demand hardly affected by price wars

BY CAROL HILDEBRAND and CHRISTOPHER LINDQUIST

cuting combined with a de-pressed economy have created a vicious cycle trapping desktop hardware vendors into so-far fu-tile price wars designed to tempt unresponsive users. With the re-

\$5.00

#### INSIDE

Moving applications off the mainframe and onto ser ers has United Airlines fly-ing high. Page 6.

Microsoft moves aggres-sively with new and upgrad applications. Page 115.

DEC to market the Macin tosh in Europe. U.S. next? Page 115.

Product Spotlight — Dis-counts abound in the main-frame market, but 'buyer

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COLIN CROOK

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PRODUCT SPOTLIGHT

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# EXECUTIVE BRIEFING

■ A soft mainframe market equals steep discounts — as high as 40% on the latest technology from the large systems players. Mainframe sales declined nearly 5% last year. Although recent announcement are expected to fuel sales in the next year, growth forecasts are only in the single digits, making vendors willing to negotiate not only on price but also on add-ons, education and services. Page 71.

PC price wars are expected to continue for at least six months, as new discountthe for at reast six minimus, as new discounting by IBM and Compact creates a ripple effect downward. But competition may be the death of some small clone makers. Analysts advise holding off on purchases as long as possible to get the best deal. Page 1.

 Downsizing takes off at United Airlines, where a production scheduling appli-cation has been moved from a 3090 mainframe to a network of Unix servers. Page 6.

■ DEC and Microsoft will strengthen ties with a plan to link Windows more closely to DEC's client/server archi-tecture. Page 1.

structure and expects to be recloping almost all of its wapplications for that plat-rm within five years. Page

Citicorp hopes to sla communications costs \$100 milion a year as a res of a plan to integrate dis rate global networks. Fi step: consolidating bandwi usage into one global netw

apawn a host of security problems, according to secu-rity experts. Conference go ers say businesses need to pay greater heed to securin ant networks as they

of but as acquisition of Access nology's 20/20 and products isn't likely to b CA's lackluster perform

orks, but an in

If The new machines nice, but DEC users an

s cost, time and efects, CSC Index

33. The collective combinowledge of the U.S. Mari Corps from the Halls of Me tenums on down is going of

# The 5th Wave



# THE BEST KEEPS GETTING BETTER.



Best performance.
Best features.
Best value.
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# CA seeks spreadsheet share via Access buy

BY JOHANNA AMBROSIO

GARDEN CITY, N.Y. .- Con

the top-selling spreadsheets and remains use of the 20 most in-stalled personal computer pack-ages of all time, according to Computer intelligence/infocorp, a La Jolia, Calif., market re-search firm. However, the situation "is

However, the situation "is not encouraging for CA," and Jack McGrath, a spreadsheet consultant in Hingham, Mass. "They are come." consultant in Hingham, Ma "They just can't seem to pe

Buyers dwindling Supercalc has about 5% of the in-stalled PC spreadsheet base, said Sanipy Kunura, senior vice presi-dent at CA. But a Computer In-telligence survey of large users showed that between October 1990 and September 1991, few-

# IBM's OS/2 2.0 delay may be unlikely blessing

BY ROSEMARY HAMILTON

net years or lighting 2 credesis-tion of the control of the contr

baggy, spoket would have been influenced with the count that people like us had made groups to you want to be a season of the count to an extra the count to an extra the count to an extra the count to the count to

Banc One Services Corp., also based in Columbus, Ohio, is religious a several-phase project that is based on OS/2. The bank has been testing heta versions of Reiesse 2.0 and "plans to deploy it is all the branches," said offerty Lowder, vice president of the advanced technology group at Banc One. However, the first

dated by Release 1.3, he said.

Phase two will provide the graphical user interface for the workstations and will require the Warkplace shell that in part of Release 2.0. "We need Release 2.0] early for development but not for production," he said. "We'll wait for the March re-lease for that."

Other customers are inter-

in getting extra time to

## Windows vs. OS/2, again

a of last week, 170 developers have taken Micros up on its offer of a Westown Schlware Developen Rt (SDNO tomplace so QSZ 2-DSR their it will a supporting early next year,
However, the Microsoft numbers do not uncessing a large of the Microsoft numbers do not uncessing a large of the Microsoft numbers of our of uncession of OS/2. Some developers contacted best and they were interested in IRM's constantific of a fit of its at well.

work and shay were interested in IDNA construction of a few collection as set.

100 May 100 Ma



"ORACLE SERVER NLM TAKES TOP HONORS FOR SPEED, RELIABILITY AND ROBUSTNESS" Sara Lee Corp. and PC Week Labs.

"The project at Sara Lee was ambitious. The original database application that the company wanted to downsize to the client/ server platform was a subset of its order-entry

"In the end, ORACLE Server for Net Wire! was the only software that met all the stringent

white each product competing in the state of displayed strength in one area or another, ORACLE Server was at or near

the top in nearly every competition.

"ORACLE Server's performance shined on database queries that required complex aggregations—sometimes move than twice as fast as other products...

fast as other products...
"In selecting ORACLE Server as the winner,
the judges considered other factors such
as product maturity and experience with
corporate databases, and the selection of fronend tools to access the database.

"(And) even though the NLM version of ORACLE Server was new, it was considered to be a close extension of the firm's OS/2 and Unix products, which are proven technology on client/server platforms."

-PC Week June 24, 1991

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ns to two of the largest problems — match-

per-optic backbone network, control of 52 color X terminals on two an underground computer room.

ing pilots and flight attendants to planes and routes — are already

# United shift to Unix heats up

Move to client/server scheme from IBM mainframe could save millions

BY ELLIS BOOKER

being eigerry warched by Curi-ce's information systems group. United -will save befween \$3.5 million and \$4.5 million im-mediately by moving a schedul-ing application from an IBM mainframe to a Unix-based

Onted.

The project, which west live Oct. 28, is moving a 2-year-old crew scheduling application, which had occupied about a third of one of United's 3090/600S

es, over to four in a direct \$1 million to \$1.5 mil-

be added.
United is already working on a second downsizing project, said Warner Schlais, director of Unit-

move the core database query programs from an IBM MVS mainframe to Unix. The Focus and SAS products are used by virtually all of United's

be hopes to receive funding for the project by year's end. A phased migration to Unix will take six to 12 months.

mg puts as surroged terminate to planes and route — are already up and running. By December, all of United 8 obmestic scheduling will be on the Units platform, and sometime entry next year, and sometime entry next year.

he international operations will

3090," Serlin said, noting that applications that do not require centralized databases can be rei-

#### Macintosh blueprint yields few juicy details Apple to offer guidance on client/server systems

BY JAMES DALY

ers engaged in the tricky you or dding a client/server system i get a break in January, when ple releases a boiled-down raion of a key internal docu-nit that offers implementation reprints for a variety of hard-docu-

blueprints for a variety of hardware and software configura-tions, sources briefed by the company said last work. The document, called Vital, summates the collective experi-ence of Apple integrators. Used for years within the company, it contains a series of architectural unides designed to assist; mers in

Com you keep a secret?
One reason behind Apple's hest-tancy in the last that the doctors are all the secretary in the last that the doctors are all the secretary in the last that the doctors are all the secretary in the last that the secretary is the secretary in the secretary

ment.
However, Appie's push to enter the corporate market, coupled with increased user pressure, is thought to have facilitated Apple's change of heart.
The release of Vital will also
further Apple's drive to get its
machines into the informational
infrastructure of large firms.

BY JAMES DALY

PHOENIX — Armed with a "Bueprint for the Decade," Apple Computer, lic. executives moved last week to taddress technology direction issues ensating from the campany's re-contine revitallies, and the contine revitallies was big on ideas, it was short on details and delivery dates. Apple's bluspraint is embodied Apple's thought in the continer revitallies and the continer revitallies was big on ideas, it was short on details and delivery dates. Apple's bluspraint is embodied that reveals the wide craping technological path the company

that reveals the wide-ranging technological path the company intends to follow through the rest of the decade.

There are few surprises among the key goals outlined in "Blueprist for the Decade."
However, Apple did say it plans to equip its eather Macientosh computer line with a reduced incomputer line with a reduced in the control of struction set computing chip ar-chitecture by the middle of the decade. The firm also acknowl-edged that it is "experimenting"

edged that it is "experimenting" with pen-based systems. The document also outlines points that Apple has already raised, including a series of up-dates for the System 7.0 operat-ing system, the release of Sys-tem 7.1 early next year, the joint

CORRECTIONS

An International Briefs item [CW, Nov. 11] incorrectly char-acterized Computer Associates International, Inc.'s plans for distributing its products in Eu-

Analysts, too, said the outline is a good way to bolster customer

Apple and IBM will pull off their technological joint ventures.

"Apple wants to avoid having its customers feel uneasy because if they are uneasy, they might stop buying machines," said Pieter Hartscok, editor of "The Hartscok Letter," an industry newsletter in Alameda,

Cald.

Among the areas covered by
the document are the following:

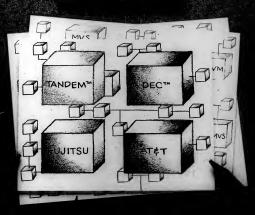
• An ambitious update schedule
planned for System 7.0. Additions will include improved data
exchange with DOS and Microsoft Corp.'s Windows, integration of speech-recognition capa-

The company has no plans to suspend its practice of selling directly to large customers.

The news item was drawn from a report in Le Monde Informatique, a Computerworld alfiliate in France.

The original French report

Henever, analysts said Apple still has a lot of explaining to do in this near. Too's think they do-tunted explained why users should wait these years for this when they can have [Nest, Inc.'9] Nearstep today," allowing Card, an analyst at Interna-tional Data Corp. in Mountain View, Calif.



# NEWS SHORTS

or CEO takes IBM job

AISA solls Company to feels
rement Division of CompUSA signed an ag
pay Computer Corp. by which the computer
company computers to federal, state and local
memory will continue to and monkets to feels
memory will continue to and monkets to feels

nix boxes roll from interg ergraph Corp. hat week solled out two statistical for its Clipper C400 series and

IM garners a silver gaase ding it "one of our most significant wise this only begind a one- to five year contract to p

MP takes lock, stock and barrol P, Inc. lat week completed its acquisition of Business.'s extending capital stock, and shareholders voted

# Netware 1000 takes direction

Novell, Inc.'s Netware 1000 software is finding a role as a software is finding a rose as a stand-in for an enterprisewide directory service that the Provo, Utah-based company said it will deliver later next year. Netware 1000, a not yet officially available version of Novell'a Netware 3.11 network oper-

3.11 network oper-

Novella Merware autag system sup-porting up to 1.000 personal computer has started to take shope. Limited to support to the support shope. Limited to support side to both our infor-mation for large prosput. See the support support side to both our infor-mation for large prosput. See the support support side to both our infor-mation for large prosput. See 500 per serv-tected customers for between \$25,000 and \$25,000 per serv-tected customers for between \$25,000 and \$25,000 per serv-section of the support suppor

Atlantic Richfield Co. (Arco) Atlantic Richheld Co. (Arco) has purchased at least one copy and plans to buy as many as three more by year's end, said Mark Philipot, network administrator at the company's Los Angeles refinery. "We are using it to kind of create our own haming service," Philipot said.

Novell'a naming, or directo-ry, services are currently limited to covering domains of about eight servers at a time. The utili-ty has come under fire as being inséequate, especially for large organizations that want to let us-ers log on to the whole network.

Netware 1000, users had the choice of waiting for Novell or migrating to Banyan Systems, Inc.'s high-ly praised Streettalk

nymity, said Net-ware 1000 can serve nicely as a central point to which users can log on without limiting their network access. Some suggest-ed that Netware 1000 could keep large firms wanting enterprisewide directory services pacified until those services can be shipped with Netware 3.2, scheduled for the end of 1992.

Too small for some
However, Netware 1000 would
not address the directory concerns of all large firms. Even
support for 1,000 users is too
pultry for some firms, said Shotoon Bryski, senior vice president
at Bankers Trust Co. in New
Nort. "We have 7,000 PCs," be
said, Bankers Trust would still
have to coordinate directory serhave to coordinate directory serhave to coordinate directory ser-vices for many machines. It even presents new prob-lems, one of which is overcen-tralization. "I don't want [net-

world traffic from London prime. New York part to sociast the world of the control of the contro

# AT&T answers call for frame-relay service

BY JOANIE M. WEXLER

NEW YORK — Long mum about its intentions to deploy frame-relay service. AT&T will today announce mid-1992 service availability and erase the largest question mark surrounding the ubiquity of frame relay in the orbification.

ing the ubiquity of frame relay in the public arena. AT&T's entry will supply the industry with healthy competi-tion and spur user awareness about the neophyte technology, which is expected to grow to a \$1 billion market by 1995, analysts briefed on the announce-

ment said.

Frame relay is a fast form of packet switching aimed at such critical applications as local-area network interconnection.

AT&T's service will initially span about 100 cities nationwide, with international extensions expected to follow.

dent in the telecommunications consulting group at The Yankee Group, a Boston-based consulting firm, said AT&T will support a range of access speeds and will integrate public and private services. "These things have not been emphasized in other frame-

America, Inc. are providing service to a sparse number of users.

Analysts and ATE T will be used in frame-relay offering into a whole new data services package—a sparse from its Accused product line—that includes other services appropriate for applications that do not fit the characteristics of frame relay. The new services will be administered by a subsersion of ATE TB Business. Communications Service called the AT&T Data Co

relay services announced to date," he said. Frame-relay announcements have already been made by di-rect competitors U.S. Sprint Communications Co. and MCI Communications Co., Network service providers Wiltel, Com-

Unit, officially formed today, an AT&T apokesman said.
The initial offering is expected to run at traditional 56K bit/sec. to T1 (1.54M bit/sec.) speeds, although T3 (65M bit/sec.) service is under development and could emerge by year's end, analysis said.

On March 12, Oracle' recorded the highest TPC

425 tpsB

319 tpsB

153 tos8

On March 12, Oracle recorded the highest TPC Benchmark B rate ever: 425 tpsB on a VAXcluster. And the fastest TP1 score ever on January 21st: 416 tps on an IBM-compatible mainframe.

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42.4 tps

# Users hungry for interoperability

BY MARYFRAN JOHNSON

is very important in the world of systems that we don't pretend to all the answers." Strassmann said.

s will be a "principal contributor" to the value of open systems, Strassmann said, "This is a set of benefits you can ex-

as from Hewlett-Packard Co.\* A Apoli-vision for computer-aided design work. At Barclays Bank in England, the cor-rate sizategy is heading toward opes steems, and its branch network is now cheed with Unit-based BiM RISC Sys-m/6000x. Tet security concerns are it tentamoust, and Paul J. Pauliner, i-flowers about security contents are Worries about security and network imagement were also reflected in a user revy released at the conference (see

## Open sesame

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the Ingres o. ge from \$4,000 to beneating on the

censor and under the Decwin-dows user interface; now it will run on IBM-compatible PCs un-der Windows 3.0. It is slated to be available in December for \$995 per PC. Ingres/Visionpro. a charac-

es, is now



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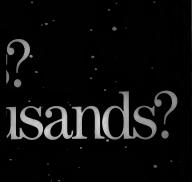
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that million dollar question:
why didn't I do it sooner?



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# Bull launches 'vendor-neutral' service

BY KIM S. NASH

BILLERICA, Mass. - Like other bigfirms serambling to supplement flag-hardware sales, Bull HN Information ems, Inc. is establishing a "vendor-

week. Analysta said they doubted that Ball's Integris subsidiary, which spens today, favor its parest company's will become a major integrator, citing in productor over those from other attents and focus on technology rather than business consulting. "People don't deal suggests that the companion of the compani

want technology. They want their business problems solved, and Bull may not be able to do that," said Bonnie Digrius, program director at Gartner Group, Inc. in San

Steve Gardner, president Integris, which is based re, claimed Integris will not



ny is not averse to using Bull's product. In a "three-year, recently signed with a large telecommunications compa-ny, Integris is tying together several large Bull systems, Gardner said. He declined to me the client.

contract

name the client.
"I have no doubt [Integris]
has a Bull bias," Digrius said.
Integris is now bidding on
10 contracts, with 70 more
prospects "in the hunt,"
Gardner said. First-year sales

will top \$20 million, doubling to \$40 mil-lion within two years, be predicted. Customer targets include Bull's 50 to 100 largest North American sites as well

Integris will specialize in five technical areas: migrating CICS/VSAM mainframe applications to reduced instruction set

applications to reduced instruction sec computing workstations; imaging; con-necting local-area networks; LAN securi-ty; and designing personal computer- and workstation-based sections of client/ server applications. Gardner claimed Integris is the first in-tegrator formally committed to the Open Software Roundation's Distributed Com-puting Environment and Distributed Management Environment standards.

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# MCC's EINet to go on-line

BY ELLIS BOOKER

CHICAGO — A U.S. information technology research consortium last week disclosed plans to build a national electronic

noisgy research consortum ast week closed plans to build a national electro network aimed at exploring new, fis ways for the industry to conduct busin and develop products. Scheduled to go on-line next Mar the network — dubbed EliNet for ent prise integration network — is be launched by Microelectrosics and Cc puter Technology Corp. (MCC).

nology consortium representing leading U.S. and Canadian users and developers. Initially, EINet will connect a portion of MCC's 22 shareholders and 49 asso-

caste members.

MCC said it is currently negotiatin
with an unnamed carrier to be the prima
ry provider of the internet. The grow

and exectrone-man mans with their training partners, customers and industrieers, these "point-to-point" arrangements are still far too complicated an take too long to build, MCC Executiv Vice President and Chief Operating Officer Alan Salinbury noted.

Acknowledging that many govern

ces. Future advances
ided as they are requested.
he EINet will cost about \$750,000 to
h, MCC officials said, adding that the
work should become a self-sustaining
three or four years. Tiered



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# Alliant, Cray, Intel prep super systems

BY J. A. SAVAGE

ALBUQUERQUE, N.M. — Astumn may denote a winding down of the life cycle, but for the supercomputing community, this fall is turning out to be a real free storm of barn-barner product introduc-

cions.

Cray Research, Inc. and Intel Corp.

each claim that the supercomputers they
will roll out here today and tomorrow at
Supercomputing '91 will best Thinking
Machines Corp.'s market-leading performance of 1 trillion floating-point opera-

company.

company has promised a measure lel computer by 1993.

Cray's Y-MP C90 has a peak performance of 16 GFLDPS, which Charles Grassi, marketing analyst at the company, claims is faster than Thinking Machines on "industry-standard applications."

— atto-sland data distribution."

solid practical control has one to 128 fact using the control of t

GFLOPE.

Crisis Mandle, Alliant's chief encouries efficer, said that although Alliant's chief encouries efficer, said that although Alliant's resides in bigher than Crey's, it is primarily turnously to the control of the control of

# Cray goes on with Floating Point buy

BY J. A. SAWAGE

A Cray spol

make everything WORK together. SUPPORTING

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assistant in 1988. In 1999, it acquired the
aims of Celerity Computing, for,
the had to Unit- house object complete
gain is better understanding of open
in house notified.

te 1987, Floating Point has posted tive losses of at least \$82.3 mil-

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your COMPUTER Network and

COMPUTERWORLD

NOVEMBER 18, 1991

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performance of our Open VAX



With the best principerformance, Open VAX VMS bests over RISC.

#### Performance

Our VAX VMS has always been known for its versatility, dependability and rich functionality. But lately, what about its speed? Well, hang

onto your keyboard because the by the user.

VMS actually exceeds the fastest RISC systems. And that's based on tests representing real-life applications with audited results.

#### Price

Such high performance doesn't come at such a high cost. In fact, Open VAX VMS delivers the best in price/performance. Again, that's not our opinion - that's based Open VAX VMS on the same real-life is the best system in audited tests. its dass.

And to reduce your software

costs we are the industry's first major vendor to license software the way you use it -

#### **Functionality**

We give you the best speed and the best price. So you think we must have taken out all the functionality, right?

Wrong. Since Open VAX VMS is VMS, it's the most functional computer available. With

the most com-

plete networking capabilities. The use system software.

The most productive development tools (which, by the way, have led to over 10,000 applications). And the absolute best at protecting

your data and ensuring that it

will always be there for you. Open VAX VMS also offers you the most flexible growth path - from \$3,450 desktops to huge datacenter systems. And with the recent introduction of our Multi-Datacenter clusters, a datacenter can be spread out over 25 miles and still run as one computer. If a power failure (or worse) knocks out

one site, the other computers in the distributed datacenter will take over automatically.

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Open VAX VMS is exactly what its name

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Support

Since Open VAX VMS is from Digital, it's backed by a worldwide service organization of 40,000 people. And with our open services, we can support

more than 8,000 products from over 800 vendors as though they were our own products.

So one service plan, tailored to your company's specific needs and budget, is all you'll need.

Performance, price, functionality, openness, and sup-

port. If they don't define your ideal computer system, let us know what does by faxing your list back to us at (508) 264-5472. Or if vou would

like some more informa-

tion, you can give us a call at (800) 344-4825, extension 925.

Because chances are, what's on your list is in Open VAX VMS, the no compromise computing solution.

## ADVANCED TECHNOLOGY

#### TECH TALK

## Operating in a vacuum

The U.S. Defense Advanced Research Projects Agency has awarded the Center for Microelectrons in North Carolina an 18-month, \$1.1 million grant to and are 10 trillion times smaller than the tradition vacuum tubes that power radios and televisions 20 years ago. The tips of the years ago. The ope of the cathodes, where the elec-trons are emitted, are only a few atoms in size. Unlike ex-isting solid-state transistors, able to operate in tempera-ture extremes from near ab-solute zero to more than 2,000 degrees Fahrenheit.

#### Fuszy fail-safe system

m Two scientists at Los Ala-mos National Laboratory in Los Alamos, N.M., have demos National Laboratory in Los Alamos, N. M., have de-veloped a computer program that tone fature of the developed that tone fature of the developed that tone fature of the developed to the developed that to the developed to the developed parameters that are fuzzy and was designed to pinpoint and was designed to pinpoint may gainst their out that the developed subject to the developed subject subject to the developed subject subje kin, who developed the gram with Arnie Hakki the object is to apply in appropriately, Markin d. The fuzzy resources

# Quest for machines that think

BY CHRISTOPHER LINDQUIST

Pritish mathematician Alan M. Tu-twas one of the pinneers of comput-having proposed a Universal Tu-Machine in 1937. A Turing thine would have consisted of a pa-tage divided into squares. Each tre would constitue with



It may be some time before the ques-tion becomes necessary, however. This first Loebner test was far from a true Turing Test, and the \$1,500 award was result, distant from the consequent

ually distant from the grand prize. The smaller award was offered because the committee determined that no programs are currently available that could replicate human interaction for even a few minutes without some re-strictions. The full \$100,000 award will only be offered when a machine can pass the test with no restrictions.

Those restrictions included limiting the topics of conversation that could be discussed by the computer and the human control subjects (two examples were women'a clothing and dry martinis), and requiring judges and human "confederates" to hold normal conver-

Ten judges sat in front of terminals, each of which was connected to either a computer or a human con The judges were allowed 14 m "converse" via keyboard with the enti-ty on the other end. At the end of the conversation, they rated whether the

in performed, much as immonstration coday.
In 1950, Turing prepared his Turing at to determine the point at which could "think." Turing

According to Daniel Dennet, a mem-er of the prise committee and a pro-sor at Tufts University, the answer yes. "The program that would be ale to win the contest would be able to numerae with you on why it has civil ghts," be said. "I think a person who

# The imitation game

will not have more than a 70% chance of making the right identifi-cation (whether machine or human)

CHRISTOPHER LINDQUIST

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#### **EDITORIAL**

# Changing values

recent Business Week cover story noted A that the key to business success in the '90s is offering high value for the dollar. That's true in the PC hardware business, as Compaq's fall from grace has shown. Now it's software's turn.

Two is sortware sum. The PC offware upgrade wars have reached a fewer pitch. The industry's eithe — Bortand, Microsoft and Lotus — are duling it out in the mud to steal each other's customers with cut-rate promotions. If you use a leading spreadsheet now, you can basically upgrade to anyone else's spreadsheet for less than 30% of the list price. And if more not bill mice for some other modules. And if you pay full price for some other products,

And it you pay full price for some other products, you can now get a lot of free software thrown in.

What fun. For users, the competition creates a windfall of good deals at just the time when many are reconsidering their corporate standards in light of the need to upgrade massive numbers of users to Windows. It also gives users much more leverage to cut deals on service and support for

leverage to cut cean on service and suppose on volume upgrades. For vendors, though, discounting creates a big potential problem. By offering the same products for less than a third of their original price, ven-dors risk raising questions about the real value of the software they make. Maybe it is time those questions were said for a generalised or a word processor. That's what customers would pay when I care and Wordscript this the market, and processor. I hat's what customers would pay when Lotus and Wordperfect hit the market, and everyone has simply followed along. It isn't neces-sarily what users will pay today. When the discount war subsides, vendors will

when the discount war subsides, vendors will push to re-establish premium pricing. They'll ar-gue that high prices are needed to assure contin-ued investment in product quality.

It am t necessarily so.

The PC software industry already enjoys some of the highest profit margins and profit-per-employee ratios in business. Despite the high up-front costs to develop software, the fact is that a successful product generates enormous margins after the investment of the product generates enormous margins after the investment of the product generates enormous margins. rout costs to oceany sortware, us next a task a successful product generates enormous margins after the investment is recovered. That's how Louis satisfied a 256 million compensation package for its chairman in 1987 and Microsoft manages to maintain a marfeet value equal to DEC's.

If discounting creates dislocation, it's up to vendors to adupt. Borland, for example, is always

the first company to use price as a competitive le-ver. Yet today it enjoys some of the best revenue-per-employee ratios in the industry. Thinner margins create pressure to do more with less and to target market niches carefully. It's bitter medicine, but nothing the country's biggest in-dustries haven't already swallowed in the name of g competitive.

remaining competitive.

Pricing pressure in single-user software may also divert vendors' attention away from adding a few more bells and winstees to shrink-wrapped packages and toward the high-value, high-tacket areas of network and multiuser computing. If so, that will be the best news yet. Development is sorely needed in those areas.



#### LETTERS TO THE EDITOR

ways looks good.

#### Photo faux pas

on "The ethics gap" in your Ex-ecutive Report [CW, Oct. 14]. As dy attuned to ethics issue and have ongoing training and company policies with tough en-forcement provisions. This is an

note, I found your use of the "semicheesecake" photo of Alana Shoars in poor taste. Just because she is a young, attrac-tive woman is no reason to run this kind of picture. It's hard for

James E. Godfr

#### Delay tactics

ite reading your article "IBM ets OS/2 2.0 worth the wait" 7, Oct. 28] regarding IBM's fusual last week to dwell on its sion to delay... OS/2," it ick me who is beautiful.

ruck me why it keeps pushi ck the release date. The author quotes IBM exc utives who swear OS/2 will be "the center of it all." This is the center of it all." This is IBM's way to generate pent-up demand, hopefully making co-sumers rush out and plank down \$195 for OS/2.

BM can avoid soft sales

Maybe it knows we're not about to spend \$200 on a luxury like OS/2, more RAM, more hard of a long of the like of the long of lastead, IBM holds off, bedg-ing its best that by next March, the economy's pulse will thamp with a healther heartheat. And, if it doesn't? Well, October al-

DBMSS

# Gregory R. Hop Micro support specialis Columbus, Ohi Not final answer

Regarding "Offshore software crews save labor conts" [CW Oct. 28], we have been using off shore labor from the Philippine for the past five years. However the article implies that doing the work offshore in a final solution. This is true in the case of soft ware conversions, In the case of offshore development, it is possi-

sed product.

There is no substitute for di-ct day-to-day contact with the topic who are going to use the stem. Even so, developing the stem offishore to a prototype stage can represent a

Just be aware of the li-ons of developing sytems outside your state.

come outside your state.

In my experience, the Philippines offers a wealth of inexpensive talent that is fully capable of doing complex projects. It is a highly literate country with laws patterned after the U.S., and the people have the Asian work etherness.

# Premature guilt

As a software vendor, I ap the Software Publishers As ation's (SPA) efforts to co acy. But I am absolutely ap-lied that you would cite in your aide Lines section several ies as being "unition" [CW, Nov. 4].

reems of crimina-imes of crimina-private organization or private organization or with your help) is unconsciona-de. I believe that piracy is wide-opened; the SPA will be able to realish the guit of many. and need to impage the reque until their

ham, Mass. 01701. Fax no (508) 875-8831; MCI COMPUTERWORLD.

# You can't manufacture market demand



the information technology busi-ness. The worst thing we can do at a time like this is to allow the urgent need for new markets to

urgent need for new markets to overcome common sense. While most suppliers are re-sponding with strategies of real value to their customers, the search for new markets has also led some firms to develop prod-ucts that are not useful to cus-

The value of information and aformation technology to a commercial organization is not soteric. Information and knowl-dge do not necessarily translate edge do not necessarily translate into competitive power, nor does information technology. Effec-tive action in business depends on people, working within a sen-sible organizational framework and using the most appropriate information and technology.

business mission and the opera-tions which support that mis-

sion?"

The second and more subtle question is, "Does it work in the way that people work?" This does not just mean user-friendly. The best written software in the

ses in a client

catabases in a clien mode, genuinely meet the conditions for utility. If we ask what customers can do with all that additional power, the answer is, "What they've always wanted their systems to 46."

their systems to do." Moreover, these archi-tectures will serve oth-er useful purposes in the near future,

tine transactions. From the out-set, the equipment became a product in search of a market. Banks said they would not bay in-teractive video. They explained towns and

# Maybe we like inky fingers

Paperless news delivery is old news, but it may never make it out of print

For an long as I gly end-

CHARLES P. LECHT

dusley what today's newspapers. Each time the realization hint, we not offered visions of the receives from subscriben may represent the receives from every computer manifestage. Hereafters we not from every computer manifestage flattents we not from the receives from the receiver from the receiv

NOVEMBER 18, 1991

New words are coined to de-scribe the electronic newspaper device. A recent Los Angeles Times article on the subject of-fered both "multimedia home in-

at the future of news di

ination that we, mere mortal readers, can only surmine.
We cannot help but suspect, though, that the writers don't have says more of a clase than we do of what the meaning of newsper will be in an era devoid of the paper kind. There are many implications that are never addressed — what the word "news" will mean in that context; how it will be delivered; what we'll be wantine; and what

N TRYING TO describe a paperless future, we seem to be caught in Ber-trand Russell's famous paradox — trapped in the enve-lope we wish to assay.

s some of thi

am against an electronic newspa-per in the future. I am not. I just don't know what it is.

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# **SYSTEMS & SOFTWARE**

#### HARDWARE SHORTS HDS gives CPU boost

nouncement that end Enterprise tem/9000 processor e rated 11% to 17%

# VAXs earn praise, but few buyers

BY SALLY CUSACK

Digital Equipment Corp.'s VAX/VMS users applauded the enhanced price/performance of the VAX 6000 and 4000 lines ounced last month, but that not translated into buying as except for users with im-tiate power needs. Other users, who can wait a year or more, are eyeing the shadow of DEC's Alpha project, which is expected

lysts had expressed concern that the new systems might not catch on because of the promise of Al-pha — DEC's entry into the world of open architecture, re-

Support at Associated insulance Companies in Indianapolis. Associated Insurance has been using WAX equipment for more than two years. The com-pany is considering adding sev-eral 4000-class machines in fo-

cused marketing units.
The first Alpha systems, bessed on specially configured CMOS chip sets manufactured by DEC, are due out in 1993.
The boxes will accommodate both VMS and OSF1 operating

and then determine what we

## Loyal users take RISC

# Signing on-line yields productivity benefits

Installing relatively small im-aging systems such as signature capture or signature recognition setups is a simple way for compa-nies to get their toes wet in im-aging while stepping up produc-tivity, users and analysts said. "It can be a finite project, as big or small at you want it to be,"



#### tlight VSAM processing can be a breezel

Fig. a product which is designed to significantly increase or USAM in every DOSIVSE installation. It does that by the OSAM before transparent to all programs, does not all OSAM before transparent to all programs, does not all officerot, experience with some DOSIVSE installation or is different, experience with some DOSIVSE installation or in USAM jobs of physical VO by up to 50%, CPU time up and time up to 60%.

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needs for application development tools that address re-origineering of existing applications, and tools that support building new applications for the clienturews, ASMO0 and cooperative processing environments. As application development tool environments, as application development tool environments, and application development tool environments. Knowledge-Ware is working to be them first. Call 1-800-336-41100 for our free color brachaste. With a partner like Knowledge-Ware, voice always one jump laised of the competition.





# THE LAST REVOLUTION WAS FOR PEOPLE WHO USE SOFTWARE. THIS ONE IS FOR THE PEOPLE WHO WRITE IT.

122

Thanks to the graphical revolution, computers have never been easier to use. Or more difficult to program. That's why the industry is so feverishly working on

object-oriented systems, where powerful applications can be developed in a fraction of the time they require today. But, while most companies won't

unveil their first efforts for at least three years, only NeXT has a refined and proven system that works today.

The NeXTstep\* environment is a true object-oriented world, right down

to the system level. It simplifies the task of writing sophisticated, intuitive

applications by giving you tools you've never had before. NeXTstep's Application Kit" provides the interface and system objects common to most programs, ready to use without any modification. That includes windows, scrolling regions and buttons, as well as objects for printing, faxing, opening/saving files, storing data, choosing fonts/colors, sound processing, even interapplication communication complete with standard dialogs.

The Interface Builder" makes it much easier to design programs that work exactly as you envision them. You use

the mouse not only to place. and resize your interface objects, but to change their attributes and show how objects interact - all without writing even a trace of code. Interface Builder also helps you manage every aspect of your application and all of your code (both C++ and Objective-C are supported).

However this is only a small part of the power you wield, because NeXTstep's object library is completely open. That is, you're free to customize the behavior of any object via sub-classing, and you can also create new objects that instantly become as easy to work with as the ones we supply.

Once an object exists, it can be used again in new applications, so you won't have to reinvent the wheel with each new project. And when you want to change specific functionality in a program, you know exactly

where to look. Updating is just a simple matter of modifying

one of your objects. Of course, in the world of NeXT workstations, custom

applications continue to offer unique benefits even after they've been deployed. They're easy to use and consistent, so training time 211 is minimized.

They offer stunning graphics and full access to all system services. In addition, they

don of a tree of nets are all proceeded, along with the power to sub-class and create exactly the obj integrate seamlessly with each other, multimedia electronic mail and the "best-of-breed" off-the-shelf solutions.

To better appreciate the power of the industry's only true object-oriented system, you don't even need a NeXT computer. Just a VCR.

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# Coffee exchange gets TIPS from Tandem to brew up business

#### ONSITE





# Users urged to examine CASE prior to purchase

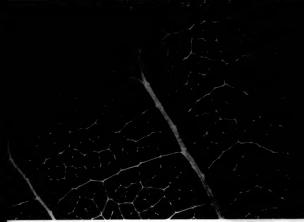
BY KIM S. NASH

can sandbag a project. In addi-tion to having a management ad-vocate, CASE should be wel-comed by a company's de-**Putting vendors** 

# to the test

o you're ready to buy a CASE tool. Fiere's what to ask

# Networking.



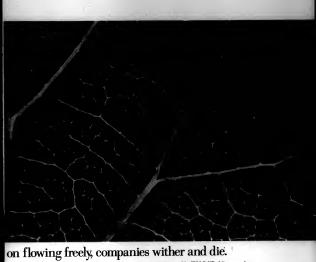
# Without fresh informati

Some say "the network is the system," but we say your network is your business. In fact, without a good network you could be out of business.

Unfortunately, for too many companies, networking is not working. Or, not well enough. Often it's because computer systems once chosen to solve problems are now causing them, because they can't communicate.

To pull things together takes a broad perspective, plus real knowledge of enterprise systems. Which makes IBM an ideal networking partner, especially since we're not just committed to open, multivendor environments, we're delivering.

For example, we're now helping UCLA build



a campus-wide network that will connect 15,000 people using Apple, DEC\* and IBM systems, tied together by TCP/IP and SNA protocols.

We're also a leader in OSL with OSI offerings across all IBM platforms. And our SNA networks are open to a wide variety of non-IBM systems. What's more, IBM's network management

systems are the industry's most robust, which is why Santa Fe Railway is using IBM NetView\* for automating operations and to control not just their LANs but costs as well.

You can also tie into the IBM Information Network for worldwide communications with customers and suppliers. And you can use voiceenhanced solutions like IBM CallPath" to greatly improve customer service.

But technology aside, the point is to get information flowing more freely around your company. And it's no longer just a good idea, it's an absolute business imperative.

Networking shouldn't be done piecemeal; you have to consider all the pieces at once—no matter who made them—and IBM has the resources for

helping you do that. To learn more about IBM networking, talk with your IBM marketing rep. Or to have one call you, call us

at 1 800 IBM-6676, ext. 880.

# Unify update may ease application ports

BY JEAN S. BOZMAN

SACRAMENTO, Calif. - Unify

cott has used the new Ac-SQL Release 2 for several

development language, Sybase's Transact/SQL language and new ANSI specifications for the in-dustry standard SQL language.

But many Unity user orga

Royal Mint in Llantrisant, Wales, near Cardiff, has been us-ing Accell/SQL since February to write code for an Oracle datame ICL Ltd. Unix ma

We didn't want our develop

CCELL/SQL RELEASE 2, an enhanced version of Accell/SQL, has been at beta-test and early support sites for several months,

users reported.

nt staff to have to learn two tne Koyal Mint. "Depending on how we compile [Accel/SQL]

Allen said support for vari

comp. In a Allen was told that Re-lease 2 would not be writible in the UK woll mad-1992. The ar-ticle was a state of the state of the

a Sequent Computer Systems, Inc. S 81 Unix machine. Norvis said the firm had to write special C code to handle the variable-

Unify continues to sen Name software, the company "is with its tools" as it approa-end users, Nierenberg said. Accell/SQL Release 2 rai in price from \$4,250 \$395,000, depending on a sen-control of the second

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## Marines put war savvy on-line

ONSITE

BY GARY H. ANTHES

CUANTICO, W.— In January, U.S. Maries Corps strategists U.S. Maries Corps strategists to the property of the p

multimedia compact disc/read-only memory (CD-ROM) discs to support specific Marine Corps

Col. William Pedersen, recently retired director of the Marine Corps Central Design and Pro-gramming Activity, called the system "the mothership for ev-erything that defines war fight-ing — books, papers, maps, oral histories, speeches and live film



#### Signing on-line yields productivity benefits CONTINUED FROM PAGE 29

ing the summer of 1990.
"When we started looking for pasture stiff back in 1987, it is want't there," said Chris sith, manager of research and selopment at UPS.
Since then, 50,000 of the sumford, Cosm.-based delivery pagany's 60,000 of three have en outfitted with DIAD units, sich are clipboner-sinc, lapses-made computers looded the insaes casture software or one of the computers of the compute

ters.
After daily routes are done, drivers plag DIADs into racks at regional offices, where the delivery data is transmitted via an X.25 network to an Enterprise System/9000 mainframe in UPS' Mahwab, N.J., data center.

UPS' Mahwah, N.J., data center. When someone calls customer service for package informa-tion, an automated retrieval sys-tem searches the ES/9000 database for proof of delivery, then prints it out to send to the

ecuout time for drivers and ster, more accurate tracing.

## New VAXs earn praise, but few buyers

ng soon. . "We're shead of our u

For Unix



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## EN ADVANTAGE.

#### Cross Access rollout offers EDA/SQL features

BY ROSEMARY HAMILTON

Cross Access Corp. in Santa Clara, Calif., last week introduced a data access pro uct set that it said offers capabilities sim lar to Information Builders, Inc.'s Enter prise Data Access/SQL (EDA/SQL).

For the short term, Cross Access will likely have its work cut out for it, one analyst said. Information Builders' EDA/SQL was showcased in September as a key component of IBM's Information Warese strategy. The companies have a

IBM's Information Warehouse In Cross Access does not have such a tie

to IBM, nor has it signed up any custom-ers for its product set, which also goes by the Cross Access name. However, an IBM spokesman said that based on his understanding of the product, it could give customers a choice of data access and de-livery tools, which is what the concept of "The idea is to have open systems and re [customers'] products fit in," the

have [customer spokesman said. "Let's face it, Information Builders has the momentum," said Shaku Atre, presi-

there is always room for a better mot trap. The next six months to a year will be their test period.

Cross Access officials acknowledged they have a big job ahead. "Our biggest challenge is that Information Builders is much larger than us," said Bronson Purdy, vice president of marketing and

sales at Cross Access.

Cross Access, which was founded as DB Access, Inc., said the product set was designed to support a client/server archi-tecture. Like EDA/SQL, it comprises several components that address data access The product will initially provide ac-cess to 14 relational and nonrelational dacess to 14 relational and nonrelational da-tabase management systems through an IBM SQL-complant format. These in-clude the following: IBM's DB2 and IMS; Oracle Corp.'s Oracle/VM and Ora-cle/VMS; Computer Associates Interna-tional, Inc.'s CA-IDMS; and Digital Equipment Corp.'s RMS and RDB. The Cross Access product set will ini-tially support DEC and IBM host plat-forms. Purely said the company will an-

License fees are based on system con figuration. For example, a single-system license supporting DB2, IMS and VSAM on an IBM 3090 Model 400-class processor would have a license fee of \$192,500.

#### NEW DRAIS Scottish bank adds HDS gear

In the 70's, everyone wanted an easy-to-use relational database. They settled on Oracle. But it was slow. In the 80's, everyone wanted speed. Sybase promised speed. But only for short updates.

Now the 90's demand both - and a lot more. An RDBMS where high performance measurements go beyond the repetitive, short write benchmarks of OLTP. An RDBMS that is truly easy to use, and designed to meet today's increasing challenges. In the 90's, businesses need OLCP (On-Line Complex Processing) — a database concept that allows you to build more complex applications, perform more complex analyses, and use more complex data in heterogeneous environments.

Which brings us to the small print.

#### **Before you** settle on Oracle or **Sybase** for OLCP, read the small print.



#### NEW PRODUCTS - SOFTWARE

#### Development tools

Software Eclectics, Inc. has released

SE/One Version 2.1. SE/One is a software tool that helps prepare Cobol programs for upgrade or conversion. It works with mainframe batch and CICS programs. SE/One now includes a reporting phase that flags nonstandard code sequences and unrefer-enced data and procedures. It also includes an interactive phase that allows multiple abstract views of the Cobol pro-

SE/One 2.1 is priced from \$2,600 to \$35,000 for a site boense, depending on

need to handle OLCP applications.

the number of users. It runs on DOS-

sed personal computers. oftware Eclectics 730 Starcrest Lane Marietta, Ga. 30066 (408) 926-3331

Foundation Software, Inc. has released 4G-Cobol, a mainframe Cobol tool for de-veloping batch programs. 4G-Cobol integrates high-level com-mands with Cobol source code. Its fea-

mands with Cook source code. Its rea-tures include advanced report generation, Cobol resource definition, automated sorts and a Cobol macro language. Pricing is \$30,000 for MVS systems and \$20,000 for VM/VSE systems.

Foundation Software 422 Courtyard Drive Somerville, N.J. 08876 (908) 704-0022

BMC Software, Inc. has announced Ver-sion 1, Release 2 of Londplus for IBM DB2 databases.

DB2 distabases. Londpius loads DB2 tables up to four times faster than the DB2 Load Unity it replaces, according to the company. The new version, available immediately, incorporates a new Ignore option that by-passes writing-specified discard types, thus improving performance. The upgrade also loads nonpartitioned table

Tiered pricing for a perpetual license begins at \$14,500. BMC Software Box 2002

1 Sugar Creek Center Blvd. Sugar Land, Texas 77487 (713) 240-8800

Brickhouse Associates, in conjuction w Masc AG, has announced the available of Masc-Cao, a VTAM application to enables a mainframe batch job to emula

erminal.

Masc-Cao automates repetitive or octions and transfers data from exisources, such as electronic d

change, to on-line applications.

The product is available for VSE and MVS systems. Pricing ranges from \$15,000 to \$22,000.

Brickhouse Associ Patterson, N.Y. 12563 (914) 878-7721

The Adesse Corp. has announced Releat 1.0 of VM/ESAid: 370/ESA Compatibil

Modifications.

The product allows an XA/KC mode virtual machine to execute programs that run correctly in 370 mode but fail in XA or XC mode. The product's S370 mode can be enabled for all users or for specific us-

re enaued for all tuers or so ers and programs. Pricing starts at \$13,000. The Adoese Corp. Suite 307 36 Mill Plain Road

Danbury, Conn. 06811 (203) 790-9473

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Since 80% of the decisions you make are based on dynamically changing complex events - not short data updates - only the OLCP database will do. Only InterBase delivers the technology you



ORLAN

#### Processors

Digital Equipment Corp. has reduced the prices of its memory options for VAX and Decistation systems.

HARDWARE

The price cuts range as high as 47%. The cost of a 64M-byte option for the WX 4000 Model 300 is now 330,400; for the VXX 6000, 684,000; and for the Dectystem 5500, \$20,160.

BEC has also reduced the price of its ESE20 solid-state dails drive by 27%. The 120M-byte drive now costs \$80,000.

DEC 146 Main St. Maynard, Mass. 01752 (508) 493-4479

Tricord Systems, Inc. has added a ser-maintenance processor and a disk dr expansion cabinet to its Powerframe I

and provides server and network me toring. The Powerfile expansion cabi toring. The Powerfile es (\$6,750) offers 12 full-19.2G bytes of storage

Powerframe server based on the Intel I486 processor. It includes 8M bytes of memory, a 415M-byte hard drive and a small computer systems interface of troller. The Model 30L is priced un \$15,000. icord Sys



# PCs & WORKSTATIONS

#### COMMENTARY James Daly

#### This duo may beat the odds

ny, a leader in the field of enough, they were enough, they were often powered, and if they powerful, they were often ad chanky. The 5-pound rbook 100 puts that dicho

## Users weigh pros, cons of color portables

BY MICHAEL FITZGERALD

As notebook computer venues proclaim they have seen the Holy Grail — battery-powered color products — and promise they will reach it and start ship-

## Finance firm makes distributed move

BY KIM S. NASH

WEEHAWKEN, NJ. - Pa

ups — using an integrated com-puter-sided software engineer-ing (CASE) tool set from Seen Technologies. Inc.

AD/Cycle

#### Put IMS Application Development in its Place with the IMS Option from Micro Focus. Over 10,000 IMS" developers have moved

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their COBOL application development off the mainframe to a PC workstation with the Micro Focus IMS Option and Micro Focus COBOL/2 Workbench". The results?

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ming facilities of COBOL/2 Workbench, bringing new levels of efficiency to the developmen and maintenance of IMS COBOL applications.

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## **Expert systems put Fedex in flight**

BY MARYFRAN JOHNSON

MEMPHIS — With thousands of letters and packages streaming into Federal Express Corp.'s major airport his here every day, put the critical task of tracking and launching aircraft belongs to a handful of Unix-based worksta-

tions equapped with expert systeems software. File Pedex's five ramp tower controllers, responsible for tracking her and scheduling more than 85 inbound and outbound flights deily, as began using Sum Microsystems, on Inc. Sparrestation 1s last year to handle tasks once done manually for

with grease pencils, blueprints and slabs of Plexigias.

"This seemed like s good launching point into expert system technology," said Pat Crow, who manages the in-house development team that created the Ramo Management Advisory

Sparcetations.

Now in its fifth release, Clanguage-based RMAS is serving as a small-scale model for the courier giant's plan to eventually expand the use of networked expand the use of networked ex-

The RMAS design will be men part of the Global Opertions Command Center, which 'eder's long-range plan to or compass all pertinent transpoation and scheduling data in setworked, distributed systeesced on IBM and Tandem Conuters, linc. mainframes as laix-based workstations.

At this point, the five Span stations are linked via Etherne backbone and Sun's Networ File System to IBM and Tander mainframes at headquartes here. The current command as control system — lynown simpl as the Saper System — reside

RMAS.

if there on fines
IAS is used to synchronize
th processing time, ensuring
sincraft get there on time to
tiver their packages on schedMultiple piccos of informanare logged into the expert
teem through Sun's Open
the graphical user interface—
rything from data on inmolycubound flight arrivals.

odox schodulos Aughts with its Ramp Manag system running on Sun Sparcetations

rations and pilots. Information received from both the pilot of the ramp controller's own viaid check of the landing area. "We have 400-eome acres to ansage, and our people basically are to see that aircraft, don't ump into each other," said row, manager of systems opertions and expert systems. Ramp controllers are there to naure an efficient launch, and MASS belost here do that:"

nons and expert systems. Ramp controllers are there to sa naure an efficient launch, and let MAS helps them do that." Each aircraft has its own icon in the workstation screen, and is a hanging strius is tracked arough color-coded changes by

pilots. Information made automatically by the syfrom both the pilot tens. The database for the syspostroller's own vitche landing area. We recommended the second 400-scme acres to our people basically were rejected for lack of spee that arrorate don't and functionality.

> choreograph flight data and measages more efficiently and with less chance for error," said Catherine Addy, manager of systems control and ramp tower operations.

are now completed within minutes and logged into the Super System on the Tandem mainframes, which are connected to the Sparcetations via an X.25 communications inc.

An IPA mainframe maintains

An IBM mainframe maintaine systemwide achadies as well information on all flights as package deliveries. Schedulin, information in fed from the Supe-System to RMAS, which in turu updates the mainframes with leach date.

Information from the Spare stations automatically update the Super System, giving Fec ea's ground crew and mainte nance employees terminal-base access to that acheduling data Crews in the maintenance has gar, for example, can review th Super System data for achedule

The Memphis hub is Pedex's largest in the country, followed by regional operations centers in Newark, N.J., Indianapolis and Oakland, Calif. Crow said the Indianapolis center is lobbying now

to set up its own RMAS.

While the Sparcetation It have served the ramp control lers well so far, the group would like to upgrade the machines to Sparcetation 2s for greater speed and disk-mirroring caps bility, said Tim Gafford, a senior programmer analyst who helpes design the control when the speed and the senior the control when the senior the control was the senior than the

PC & WORKSTATION SHORTS

Microsoft to back MIT Media Lab

signed an agreement whereby Microords will become one of 26 spanners of the MIT Media Sachuschapy Group. The MIT Media Sachuschapy research facility is deficient to inventing and creativety exploiting new media for human well-being and estilaction. As a spasor, Microsoft in providing a great to the Media Rechaedyp Pand. The Media Lab, Incatad in Cambridge, Messa, was founded six seers asso.

Hewlett-Packard Co. has reduced prices on seven Vectra personal computers by up to 8000, Pour motion of the Vactra 4005/20 were affected as

well as these 386/25 models. Additionally, the 4865/20 models now have IRI Video Graphico Array buttels as eisederd equipment. Also sweeped was free, one-peer, on-site limited warranty service for all Intel Corp. 1486-bases to service for all Intel Corp. 1486-bases

Western.

IIP also measured a joint down meet agreement with Verity, finder which Verity will develop in decement measurement product.

Publishing Co. in Beguns,

Journal and C Genetic, has manusculthe creation of Windows Thick Journal The matchly is acheduled to begin alipping in January 1992. It will cance trate on development tools and advice for programmers writing applications for the Microsoft Windows environment.

Man Mileropycienes, Inc. Let west upsaled in Early of througe products for the Apple Computer, Inc. Machina with the introduction of a servitable Style. 128M-byte magneto-cytical disc drive. The drive, which man unawellar cartridges, coals \$1,796 in an external configuration and \$1,486 in an internal configuration and \$1,486 in an internal configuration. Certridges coal \$12.97 The commerce does not cont \$12.97 The commerce does not seem \$12.97 The commerce does not cont \$12.97 The commerce does not seem to the commerce of t II and Quadra families of Macintosher Those drives range in capacity from 120M bytes to 510M bytes, and they range in price from \$849 to \$2,899.

The U.S. House of Representatives has passed a bill called The Eport Administration Resistantian Act (I.R. 3489) that included a prosion that would facilitate the export PC software with encryption capabil ites, Ourceatly, PC software with encryption capabilities in classified as " mittom." and its export in avviewed in mittom." and its export in avviewed in

pertment of Defense, it also requires expert licenses. The Senste passed similar bill (S. 320) hast spring. The bills will not proceed to conference order to reconcile differences betwee the two.

XDB: DB2 Development on your PC.

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WEEK

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DBMS



#### COMMENTARY Jesse Berst

GIII

# advantages

re were fewer than e are nearly 200. Many of these product also support OS/2 and senstation Manager. If your graphic in interface (GID) programmers in't taking advantage of these tools, ye're working too hard.

I expect even recommendation of the sense of the sen

ty is working too nard.

I expect even more products in the xt 12 months, thanks to Microsoft's sen Tools strategy. Microsoft has realed Windows' inner workings so this strategy and more workings so this strategy. a windows' inner workings so third-tools vendors can create better cts. Likewise, IBM has a program to rrage OS/2 development tools. here are many wonderful products indows develor-

all and deciding which ones to use."

Let a organize things no you can figure out how they it together — and svoid the expense of sending your programmers down the wrong road. Working: It's not easy to classify these products. Microsoft's Visual Beate, for instance, is part language and part applications generator. Lakewise, Microsoft's Vicili Can disorder of the control of the product of the control of the

Section 7.6 - + are complete tool sets, not just Hanguage. But manybta get gaid to express opinions, to fine the manybta get gaid to express opinions, to fine gaid to fine the gaid to express opinions. For each category, IT amenton a few of the best-known products. A traditional representation gainguage let ay pure annually code all or part of an application. Most commercial impergrams were written in C. Windows' morter language very manually code all or part of an application. Most commercial impergrams were written in C. Windows' morter language very more considerations of the control of the contr

toois that work with a Compiler.

But you so longer have to write in C, and you no longer have to write in C, and you no longer have to write in C, and you no longer have to use the SDK to create stand-shone Windows applications. Today, you can write in other languages: C++ (Borriand C++). Zottech C++), Busic (Visual Basic, Realizer), Smalltaik (Digital, Smalltaik), Actor (Whitenster Group) object-oriented language) and Cobol (Micro Pouss Conguege) and Cobol (Micro Pous Conguege) and Cobol (Micro Pouss Conguege) and Cobol

Programming languages offer the st control and the best performance, most control and the best performance, but they have a steep learning correCode generators. A code generator greet programmers have been generator greet programmers have been greet programmers have been greet programmers have been greet programmers have been greet programmers and steep control to the greet steep greet and click. You will have to roll up pure sleenes and add your own programmers one. Cancer the greet gree both generate C code. Applications generators. These are the most exciting products. They ors. Th

never have to see the user interface code. ou generate your front end in point-nd-click, drag-and-drop interaction a 're done — no code to look at. Then add functionality to the interface.

You can use an applications generator create complete applications, but many sple find they are most valuable for

people find they are most valuable for regid prototyping.

• Resource builders. Resource builders recreate and manage the diskip boxes, icons, menus and other resources of a COII application of White-water Resource Toolbit, The Software Organization, Inc. Dialegoeders.

• Add-on functions. One of the great things about Windows in that you can plag in propagrammed capabilities such as dictables links or maintended capabilities.

and are becoming graphical. Windows ha

from third-party vendors.
These add-ons come in several forms

These add-ons come in several forms. Virtually every Windows programming product lets you work with preprog-rammed Dynamic Link Libraries. As a re-sult, we are seeing collections of pre-packaged functions (Protoview, Intersolv's Control Pak/W). Visual Basic

users can also choose from a growing ar-ray of third-party controls and add-ons. ray of third-party controls and add-ons. You can also get C++ class libraries that can be called and linked into your code. Analysis, editing and testing tools. This category contains such tools as debuggers and program editors. To-day, most of these tools are moving away from their character-oriented origins and are becoming graphical. Windows lass and are becoming graphical. testing and analysis tools. For instance, Microsoft's SDK for Windows 3.1 has a stress tester that simulates low memory conditions and a utility called Dr. Watson

conditions and a utility called Dr. Watsor that keeps a log for tracing errors. Which tools should you investigated: you're starting fresh, don't make a decision until you've investigated the appli-cations generators. They're quite good-But if your programmers have years of experience, choose tools that leverage that shall hase. In either case, check out that sills hase. In either case, check out that sills hase. In either case, check out that sills have. In either case, check out that sills raise that can are you the ex-pense of reinvesting the wheel.

est is the publisher of "Wasdows Watcher" weletter, a mouthly briefing service for soft scatives and corporate technology manager

## Voice recognition may add ZIP to postal service

BY CHRISTOPHER LINDQUIST

Voice recognition is slowly making its way into commercial applications. And while we may still be a few years away from Star Trek-style computing, several U.S. Postal Service branches are testing and using voice recognition systems to make mail delivery a more efficient and in-

Verbex Voice Systems, Inc. announced that it recently signed contracts with some 24 post office distribution centers, including those in Albany, N.Y., Providence, R.I., and Oklahoma City. Verbex supplies a variety of ontinuous-speech recognition systems including a Small Parcel landle Sorter and a Plat Sorter. continuous-speech systems alw a user to speak conversa-

John Fushino, senior indus al engineer at the post offic Albany, said be began lookin voice recognition, such as supplied by Verbex, about a

ago. "The key for us would be flexibility," be said, indicating that as the Postal Service becomes more automated in the future there will be less mail pr-



quiring hand sorting. This means it will no longer be economically feasible to have people trained for small sections of a dision area; instead, a relatively small er of sorters will need to cover a larger area. Voice recognition would facilitate that because a user trained on the voice system would be able to sort mail for any location without memorizing

would be able to nort mail for any location without memorizing street addresses or ZIP codes. Pushino is currently using a Small Parcel Bundle Sorter but is looking to upgrade to a Flat Sorter. Verbex'a Small Parcel Bun-

looking to upgrade to a Flat Son er. Verber' a Small Parcel Bu dle Sorter prevents users fro having to key in a ZIP cod thereby frozing both hands manipulate the package. A Ve "Wiccestation," which coatsasrecognition boards and a 386SI

and returns the information needed. The Flat Sorter green further, allowing users to any an address and have the coamputer flash a number on a screen corresponding to its distribution area. Proviously, users had to memorise all the addresses in a specific geographic area, it task that nometimes required weeks or task that nometimes required weeks or the second of the continues of the continues of the task that nometimes required weeks or the continues are sent or the continues of the task that nometimes required weeks or the continues of the continues of the continues of the task that nometimes are sent or the continues of the continues of the task that no continues are the continues of the task that no continues are the continues of the task that no continues are the continues the task that no continues are the continues the task that no continues are the continues the task that no continues are the task that the t

> d to memorise. Voice recogniti nates that barrier. shino said be currently has about types trained on the system, w t half using it regularly. He adds wer, that switching experienced e

gi able to train new ones quickly. Whyne Nelson, a manager at the Postal prive technical support unit in Oldshono City, and his group has been using astimosos-speech, voice-recognition chandagy for about three years. He addtitute he uses the equipment for mottions as mail sorting, though be deceded as the contraction of the contraction as mail sorting, though the reaches he is currently using. However, refer has two labs to supply voice-recpition equipment to the Oltshoma City stell branch.

#### QA optimizes PC systems

Diagnoft, Inc. in Scotts Valley, Calif., announced a product last month intended to help users get maximum performance from their personal computer systems and Microsoft Corp. Windows envirun-

QAPlus/Win performs an analysis of a PC system to identify hardware, software contention and Windows configuration problems. It checks such system compocents as the motherboard, multimedia seripherals, communications ports, disk lrives and the keyboard and reports any

The product also evaluates Windows related configuration insues such as system performance and use of Windows resources. After evaluation, it lets the use edit configuration files to optimize Windows performance based on the QAPIs report.

System configuration and problem reports can be printed either on-screen or via a printer. QAPhas/Win is scheduled for availabil-

CHRISTOPHER LINDQUIST

Libre,

## Compaq Deskpro/M easily upgradable

Technology Analysis — A roundup of expert opinions about new products. Summaries written by Compo-

| Terrority | Terr

ontry Standard Archidecmonth of the Company of the Company that is well displaced from the Company that is well displaced from the Company that is well as the Company of the Company that is a fast as of cases of the Company that is a fast as of the Company of the Company that is a fast as of the Company of the Company that is a fast as of the Company of the Company that is a fast as of the Company of the Company that is a fast as of the Company of the Company of the that is a fast as of the Company of the Com

vides a used processor card trade-in allowance. Service and supports Parts and labor are covered by a 90-day warranty. Upgradable boards have a oneyear warranty. Washase Weboart the hard disk or Vendor financial ratings

Analysts	Long-term abolity	Short-term performance	
Kerte McCartie, Males Securities			
William Gorman, Frovident National Bank	=		

Compan responds

John Stermer, program manager, media relatives: Veducive Uners are responsible feverably to our aggressive low pricing. The Designould family has been quite successful. Hower can continue to expect high-quality, low-price computers from Compan, We will offer more computers aimed at price-sensitive users, yet we will not absentia susers who review to the continue of the continue of the con-

## Dell System 333P grows strong with cache

Bertows	Performance	Eose of upgrade	Expondebility	Service and support	Value	Overall
PC Week	Gent	Needs	Subdictory	NC	Solidactory	Completed
PC Magazine 10/29/91	Not for the power-langry	Restricted up- grade options	Modest	Good toll-free bot line	Easy to use, lacks expansion	Narrow
pers						
Deniel Milestelly,			L			No complaints
terre Levis, Fried, Presis, Harris, Shelter & Jacobson.			=		L	Very happy with Dell
oragory Bridges. sering Subsure, Inc.					=	Very naturalis
inolysts						
corge Thompson,	L	L	-	=		Provides up- grade path
Andrew Septents, Determine, Inc.	L	L	L		L	Good
colle Floring, ierteer Group, Inc.		NA.	NA.	=		Never had to pop the hood
erry Carea,		-	1 .		-	Great Vyes

Vendor financial ratings

Dolf Computer Corp. reported \$12.4 million in not income on subre of \$200 million for the second quarter of facal year 1500, which ended in Jugest 1501. The rise in not accoust represents a felt increase over the same quarter in Sacal 2501.

Dell responds

Ennse of appgrendes The extra minutes required to remove components in a trade-off to get one of the amaliest profile apprendable systems on the marlest. Customer acceptance has proven us right. Par-formances For some of our more price-sensitive customers, the added performance afforded by the customers, the added performance afforded by di Computer Corp.'s Dell System 333P, a modular 33-Mills 386JX Industry Standard Architecture system, offers an average base product but allows users to add optional conference when suches it a

strong compelion and start said.

strong compelion are start said that
without the optional 22K-byte cache
unit the optional 22K-byte cache
performance. But for \$149, the processor cache can be attached.

Base of upgrader According to a
386 to an \$486 is time-community.

Upgrading requires taking off the
case, expansion riser and boards and
throwing any the cache card, which

intowarg why the clear Cale, when it replaced with an 1486 module. Users also cannot upgrade without installing a set of BIOS chips from Dell. Expansional the module of the module of the control of the

a toil-free not line for technical support and a one-year warranty, there are enough upgrade manuals to fill a small bookshelf.

\$3,519, including an IBM Video Graphics Array monitor and 4M bytes of memory. Adding the recommended processor cache boosts the price to \$3,668. The price is reasonable, but the complexity of upgrading makes the system less desirable.

#### YES. I NEED A MIRACLE TO REACH ALL MY CORPORATE DATA.

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Daly CONTINUED FROM PAGE 43

k on at least one of the ultralight erbooks scheduled for a mid-1992

al, oother likely scenario: Sony could up with Apple and IBM in their joint media organization, Kaleida. That me will be charged with building op multimedia software and will ually employ 300 people in the Son sicco Bay area, according to Apple

coats. Seey would make a natural extension the Kaleida infrastructure. While Ka-la engineers are chasing the dream of iltimedia computing, Sony is cranking the high-resolution displays, optical ca and high-fidelity audio components

d in those systems.

Sony also owns CBS Records and Co-bia Pictures Entertainment — two I mines likely to be tapped as the

able measurant and a second control of the control

bit IBM FL, which was then hast occuring the industry standard.
Apple and Sony are already quickly
out of the gate, and the safe bet is that
they will enjoy a symbiotic relationship
like few have nees in this industry. Finally, it is a technological collaboration that
doesn't seem likely to crash and but
the boardroom table long before the
dreams have a chance to become a very
exciting replity.

#### RISC-based OCR family. stand-alone scanner offered

BY CAROL HILDEBRAND

A number of products embracing optical character recognition (OCR) technology hit the market recently. Umax Technologies, Inc. introduced the Readstation, a stand-alone OCR ma-

page recognition software from Caere Corp. — into a single package. The com-pany said the product writes files of con-verted documents to a 3½-in. floppy disk drive, which supports DOS, Apple Com-puter, inc. Macintosh and Unix formats. purer, inc. Macinton and unix formats. Specific word processing and spreadsheet formats can be chosen by means of a but-ton on the control panel. Calera Recognition Systems, Inc. un-veiled the M/Series, a reduced-instru-tion set computing-based family of OCR

systems. Steve Hayden, president and chief executive officer of the Summyrale, Card header colonys, and the new products inaction at speeds up to 1,000 finite-order to the state of the st

has signed a letter of intent to acquire OCR Systems, Inc. The company will pro-duce extended character recognition technology, which recognizes handwrit

# One of us has to



ms Houston, Los Angeles, New York, San Francisco, Toronto, Waterbury, CT

Cheegs, Cleveland, Dallar, Delaware Valley, Michigan, Mid-Adamic, Northwest, W.

d Affiliates: Argentens, Australia, Austra, Belgium, Benelun, Brazil, Carlibbean, Chile, Czecholik sance, Germany, Hungary, Insael, Italy, Mulaynus, Norwey, Hesz, Pyland, Scandinavia, Singapon stantard (Geneva and Zurich), United Kingdom, Uniguayy, Yugoslama Age or 1961 All rate expect the animal or expensional and beautitive and





#### Packard Bell moves to bundle LANs

BY MICHAEL FITZGERALD

CHATSWORTH, Calif. — Packard Bell Electronics, Inc., a dominant wender in the mass merchandise channel that con-sistently sells enough personal computers to land on the Top 5 list of PC vendors, re-

Packard Bell will also step up its efforts to attract value-added resellers in an at-tempt to branch into the corporate mar-

Packard Bell will sell networks with from three to 25 workstations, according to Dennis Cor, director of marketing. The typical file server is based on Intel Corp.'s 33-MH 1486DX chip and has dual floppy drives, a tape backup drive and a 426M-

ter i 20-mm 14865A/20, the other on 33-MHz 1486. These will come stands with extended Video Graphics Array a olution of 1,024 by 768 dot/in., 4M by

Bundle up
The following software pundle: soft's DOS 5.0 and Windows 3.0;
Development Corp. 'a Write, Smarth mecialized version of 1-2-3 for mecialized version of 1-2-3 for Profigy service.

cot said Packard Bell will not give a la price, but he said he expects the 14865X/20 to sell for less than \$2,40 and the 1486/33 to sell for less the \$2,800.

lead the way



Leaders become leaders by standing out from the crowd. Setting the example. And doing things better.

We're the vendor of the only integrated set of tools for DB2° identified by IBM° as strategic to SystemView". As a full member of the SystemView Design Council, we're working in concert with IBM development laboratories.

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Which, when you're in the business of building or using tools and utilities for DB2, is also a very important leadership trait to possess.

#### Users weigh pros, cons CONTINUED FROM PAGE 43

ell Computer Corp. have annous tebooks with passive-matrix scre-nile Sharp Electronics Corp. and E-merics, Inc. have promised active

the magic price po

#### Software applications packages

ntura Software, Inc. has reduced the ce of Ventura Database Publisher by

ore than 50%.

The product allows easy database for-atting, sorting and searching, according the company, it is now priced at \$295, we from \$695.

With Mitron's magnetic tape data com-

munications terminals, you can transfer data offline quickly and easily.

**Because Mitron terminals** 

are completely indepen-

dent of your mainframe,

there's never a problem with incompatible soft-

ware or disruptions to data transfer when the computer is down. Best

of all, Mitron terminals

are simple to install and

iown from \$695.
Registered Ventura users are offer rice of \$199 through Jan. 31, 1992. Ventura Software 9745 Business Park Ave. Sam Diego, Calif. 92131 619) 695-7891

NEW PRODUCTS

e Technologies, Inc. recently an-ced the Arche Legacy 486SX-25

dealtop personal computer.

The Arche Legacy 486SX-25 features
4M bytes of system memory, 128K bytes
of cache memory and an upgraduble processor architecture, according to the

pany. Tricing starts at \$2,698 without a hard

Fora, Inc. has introduced the NBX-386S/25, a 6-pound notebook computer based on the 25-MHz Advanced Micro

wices, Inc. AMD386SXL chip.
The system includes 4M bytes of ran-m-access memory, a 60M-byte hard we and a paper-white LCD with 640 by

The company also offers an optional o-slot expansion chansis for \$395. Oth-options include an internal fax/modem vice and a 10-in. external Super VGA

3096 Orchard Drive San Jose, Calif. 95134 (408) 944-0393



Perval America, Inc. has announced the SA14400 high-speed V 32 bis modern for Apple Computer, Inc. Macintonhes. The SA14400 offers 14-4R bit/sec base speed and up to 57-6R bit/sec. transmission with data compression. The modern can be upgraded in the future via soft warn downloads.

ware downloads.

The product is priced at \$1,245. The

28241 Crown Valley Pkwy. Laguna Niguel, Calif. 92677 (714) 347-0100

icrostrategy, Inc. has released the EIS-coldit for the Apple Computer, Inc.

Macintonia. The spreaduheet-based tool allows users to create executive information sys-tem (ES) applications without program-ming. A version for Microsoft Corp.'s Windows environment will be available soon. Applications ball with the tools will run on either platform, the congany re-ported. Database front-end applications orted. Database an also be constructed.

The designer version costs \$995.

hile runtime version

1 Commerce Center Wilmington, Del. 19801 (302) 427-8800

#### Peripherals



Output Technology's Le 1000 selects the correct em

atput Technology Corp. has introduced continuous-form laser printer, the La-rustrix 1000 Model 6. The printer offers both Adobe Sys-ms, inc. Postacript emulation and Hea-th-Packard Co. Laserjet III compatibil-

# High-Speed To Operation In 15 Minutes!

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operate. In 15 minutes you can be communicating with other Mitron terminals, bisynchronous terminals,

And Mitron terminals are real workhorses. They'll transfer data depend-

ably day after day, for as long as you need them and at a price you can afford. Mitron's lease plans start as low as \$311 a month - with no upfront cost.

Did we mention that Mitron terminals are fast? The STD 1600 can transfer data at 256KB; the STD 6250 at 384KB.

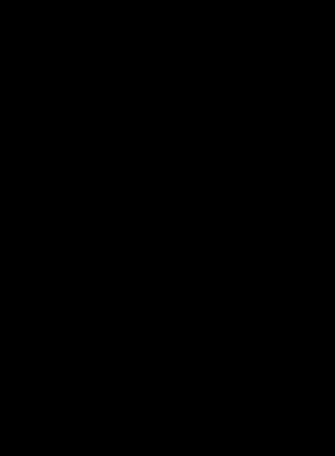
If you are still mailing your tapes... stop. Let a Mitron terminal transfer your data faster and more reliably.

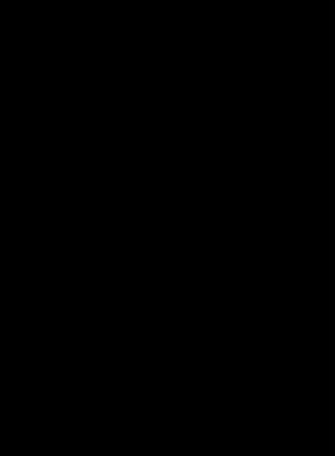
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Never underestimate the power of a great microprocessor.

# Just look at the difference

Fifty million strong and counting.
That's how many high-performance systems are powered by Motorolas 68000 family of microprocessors.
The 68040 is the 68000 family's new-

The 68040 is the 68000 family's newest member. As such, it inherits over \$8 billion worth of 32-bit software. And it's off to a fast start. Capable

And its off to a fast start. Capable of delivering 22 MIPS at clock speeds

of 25 MHz and 29 MIPS at 33 MHz, it outperforms any microprocessor at

similar speeds.

Surprised? You shouldn't be. The 040 is a 32-bit, RISC-class performance micro-processor, with instruction execution approaching one instruction per clock.

The 040 was designed from the start with price/performance in mind.

# this one's made.

Featuring on-chip cache and floating point units, it provides an unprecedented degree of integration and parallelism. Which means costly external memory accesses and wait states are nearly eliminated. The result is high sustained performance at a remarkably low cost.

So whether you're interested in desktop, workstation or commercial systems,



68040-based computers deliver the superior performance you're looking for. To see how the 040 stacks up in reallife applications, just turn the page.

# Next to NeXT, 486 PCs pa the 486 based PCs (see chart).

No doubt about it, the NeXTstation\* computer is a knock-out. But appearance is only a small part of the package. In fact, price/ performance is where it really stands out.

Especially against

This should come as no surprise when you consider the 68040 micro-

processor inside the NeXTstation. Its independently operating caching system provides better sustained performance levels than the i486." And its powerful multi-bit manipulation instructions allow for easy GUI design. Not to mention



the NeXIstation's superb graphics. With its NeXIstep object-oriented software, the NeXIstation has revolutionized programming. And with features

like built-in Ethernet, the innovative tike butten themet, me mnovative NeXTmail messaging capabilities, and the power of UNIX; it represents a breakthrough in "interpersonal computing," let it costs less than half the price of comparable systems. In other words, you have every reason to consider the NeXTstation as

your next system.

# Against Hewlett-Packard,

Fast windowing performance and low cost aren't mutually exclusive terms. Even in a workstation. The HP Apollo 425e

is an excellent case in point. Quite simply, the 425e can run more simultaneous applications, more effi-ciently than the Sun SPARCstation ELC. Just check out the Windowing XII performance. The 425e clearly outperforms the SPARCstation (see chart). And at a price/performance point that blows it away.





# rc's windows shatter.

Then again, the 425e is a 68040-based machine. And the 040 incorporates RISClike features such as integer and floating

The Workstation Market - \$/Windowing X11 Po

point pipelines, single-cycle execution, and load and store optimizations. So now people who need high-performance windowing, local processing power, fast data analysis, crisp graphics and versatile networking capabilities can the store of the store of the store of the store of the store and versatile networking capabilities can have it all with an HP Apollo workstation. Without having to pay the price.

# Head to head, Bull decks

The Bull DPX/2 Model 250 is a multi-user UNIX' system that gives you a wide range of choices. It's versatile,

operating as a workgroup server, a departmental processor or an all-purpose system for small and medium sized companies.

It's powerful, thanks to a Motorola 68040 microprocessor at its core. With a burst interface on its bus controller, the 040 rapidly shuttles massive amounts of data on and off the chip. That translates to sustained peak performance in a demanding multi-user,



# the competition.

multi-functional environment. So when it's put through its paces against MIPS RISC-based machines like the DECsystem 5100, the Bull DPX/2 is

Microprocessor	System	AIM	System	(\$ per AIM
Mosorota 040	But DPX/2 Model 250	19.5	\$26,290	\$1,346
MPS 83000	DECaysters 5100	175	\$39,940	\$2,282

awesome. Weighing in with 19:5 AIMS versus the DEC system's 17:5. And costing nearly \$900 less per AIM (see chart). With that level of price/performance, it's no wonder Bull's Motronal-based server family has already sold over 25,000 until-user systems. And more and more computer professionals are sold on Bull computers every day. computers every day.

# And as for Macintosh, ther

When the first Apple Macintosh appeared on the scene, it radically



the personal computer marketplace. And now Apple is re-defining the high end of the PC market with the Macintosh Quadra 700 and 900 computers.

Supporting up to 20 megabytes of RAM, the Macintosh Quadra 700 may be the most powerful personal computer ever to sit atop a desk. And with support for up to 64 megabytes of RAM, the Macintosh Quadra 900 is the most expandable Macintosh yet.

# e's simply no comparison.

Both come with built-in networking support. And both support all Apple displays and up to 32-bits of color.

But speed is their real distinguishing feature. The graphics architecture is faster than ever. They have enhanced SCSI and NuBus" capabilities. And each contains a Motorola 68040. As a result, they run most applications almost twice as fast as the

powerful Macintosh Ilfx. In fact, in a recent independent study, the Macintosh Quadra 900 outperformed 33 MHz and 50 MHz 486-based systems by as much as 63%:

486-based systems by as much as 63%: The speed, graphics and fledibility of the Macintosh Quadra computers set them apart from any other personal computer. In other words, Macintosh is, once again, in a class by itself.

# So when you're looking for real power in a computer, consider the source.

No matter which criteria you use. Whether you're evaluating by MIPS, XII Performance, AIMS, or simply the time it takes to run an application. The systems that come out ahead in price/performance are powered by the 68040. The microprocessor

68040. The microprocessor that has pushed on-chip integration to a new level.

a new level.

Add to that Motorola's reputation for technical support at every level.

Hundreds of Field Application Engineers and Systems Engineers worldwide have a



detailed understanding of the 68040. They stand ready to aid in the most intricate system design, or answer the most basic questions.

Finally, consider the fact that Motorola was a winner of the first Malcolm Baldrige National Award

for quality.

All in all, you know what you're getting when you go with an 040-based system. And all we can say is, more

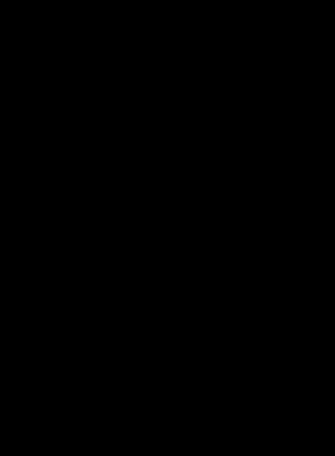
power to you.

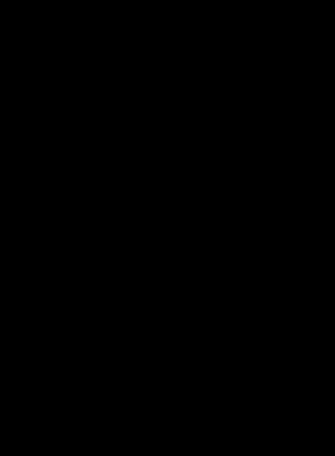
For additional information on the Motorola 68040, call 1-800-845-MOTO.



MOTOROLA

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# NETWORKING

#### COMMENTARY Elisabeth Horwitt

#### Management indigestion

### Push is on to connect the X.500 network

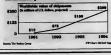
BY ELLIS BOOKER



# Inverse multiplexers filling WAN gap

# ANALYSIS

#### BY JOANIE M. WEXLES



# IBM°-COMPATIBLE SDLC CONNECTIVITY SOLUTIONS



MICROGATE<sup>®</sup>

# Push is on to connect the X.500 network

essaging providers and the U.S. Postal struce, NADF members are expected only next year to begin an experimental lot aimed at proving NADF approaches disperture interesses.

doc mines a consistency of the consistency of the consistency interconnection. Phase I will include basic interconnection of public direction. Phase 2 will tent the use of directory user agents (DUA) software with the interconnected public X.500 directories.

OWE AND HIS counterparts in the NADF are drafting a so-called Bill of Rights for E-mail users.

DUA, the search mechanism in X.500, is resident on the user's local computer and acts as the client in X.500's client/server

chitecture.

The DUA interacts with the public di-ctory's Directory Systems Agent, the echanism that handles transactions be-men public directories.

ween public directories.

Phase 3 will bring forth commercial
X.500 public directories and begin work
on adding directories from private E-mail
systems — called Private Directory Management Domains — into the mix

agement Domains — into the max.

Dates for the Phase 2 and Phase 3 tests have not yet been set because they hinge on the success of the Phase 1 experiment, Rowe said.

Rowe was quick to acknowledge that the NADF still has challenges ahead. For instance, the NADF must also devise set-

#### At your server

A-DOU product integrated with its own Openmil notivere. The HP X-500 Distributed Di-rectory, which will also be deployed on the HP 9000 Series 800, will cost from \$5,000 to \$40,000.

Another pressing issue is the sectue-ment of security rules.

"We're working up froat to deal with security issues," said Rowe, the current chairman of the NADF security and priva-group. He added that the NADF "has no intention of listing users who don't want to be listed." Indeed, Rowe and his counterparts in the NADF are orbiting a so-called Bill of Rights for Famil unsers.
At the same time, the NADF has taken

At the same time, the NADF has taken a serious look at the global nature of mes-

Not twelly successful Meanwhile, the experience of the first production quality field test of X.500, while useful for learning, "hasn't been to-tally successful as a service," and Mean-shal T. Rose at Dower Beach Consulting, Inc. in Mountain View, Calif. Began in July 1969, the laterant pilot, while pages. But, according to Rose, the

rinariant section, our "no such struc-ture exists today for organizations."

Finally, there is the political dimension of X.500. As Rose explained it, the incen-tive for companies to allow their directo-ries to be interfaced with an X.500 ner-vices in "im-mated".

Put another way, companies find value in having the rest of the world added to a common directory but may not want to add their directory, both because of se-curity/privacy concerns and because of in-stitutional inertia.

### Inverse multiplexers filling wide-area networking gap

CONTINUED FROM PAGE 53

#### Inverse standards

# Why is cc:Mail the lea











Only o: Mail can send information across all of these computing platforms to reach everyone in your organization, without the need for gateways.



Over a million satisfied customers have already given or Mail a first-class rating. For example, Windows users love its easy-to-use interface, Smarthoons' and application integration. And PC World says "Sending a cr. Mail message is easier than addressing an envirepe and liciting a stamp" 99 as a stamp" 1991.

Chapping this is that he a study event minutes of lates bening the Company of the Property of the Section 1974 of the Section

# ding e-mail package?



It's easy to see why co: Mail" from Lotus" is the world's leading electronic mail package. Because it delivers more than messages. It handles just about any electronic mail need you might have. No matter how

large or small your workgroup is. With it you can send text, files, graph-ics and faxes across all major local area networks such as Novell," LAN

Manager and Banyan. Without needing new hardware. Better still, it's the only system that

allows you to send electronic mail effortlessly back and forth from different platforms-such as DOS, Windows"3.0, OS/2° and Macintosh - across the same LAN, without the need for gateways. Plus, with cc: Mail you can access public mail and even mainframe mail

quickly and easily.

Our newly released cc: Mail for Windows takes full advantage of Windows 3.0. Support of Dynamic Data Exchange lets you easily send other mail-enabled Windows files from within those applications. For example, you can send a report you've written with Ami Pro" for Windows across the country while the application is still on your desk top.

Plus, cc:Mail is the first package of its kind to take advantage of a new, fully scalable messaging architecture. This

along with your business. Whether you're adding six new users, 6,000 or 60,000, cc:Mail is a proven solution. As PC World has said "It's clearly a best buy." PC World, 9/91\*

disk of the cc:Mail Macintosh, Windows or DOS Platform Pack of your choice, call us today at 1-800-448-2500.







You can send a file from any mail-enabled application, such as 1-2-3" for Windows and other industry uding software programs without leaving the application.



Keep things running on time with oc: Mail's ring and scheduling option.

# FCC blasts AT&T for New York blowout

#### BY GARY H. ANTHES

WASHINGTON, D.C. — The Federal Communications Commission, in a satisfing appraisal of lapses by AT&T in the Sept. 19 telephone network failure that grounded 85,000 air passengers, said the New York cotage was caused in part by "dated" power alarm capinents "jaken from the property of the power alarm capinents" jaken from the property of the propert

#### ing to the FCC.

power insture at Ail & I's I nonas Street facility in Manhattan, the FCC said, "Three levels of failure occurred at Thomas Street: failure of the power equipment, failure of the starm systems and failure of management. That all three failures might recur at the same time at the same facility at some point in the future is unallody.

the same racing at some point the future is unlikely.

"However, although AT&" has made establishing a 'sell healing' network its goal, facilities.

#### ntinue to be subject to major, tastrophic failure," the report

The FCC said AT&T stord denied that cost-cutting me sures were a contributing fact to the outage, the fourth maj network failure in less than ty years. But the commission said was "less clear" about the pos bie effects of worker morale, a it cited "anecolutal reports" understaffine and goor morale

understating and poor morae at the Thomas Street facility and other AT&T sites.

Buckup system bombed
The massive telephone outage was triggered by a failure in

Backup system bombed The massive telephone outage was triggered by a failure in AT&T's backup power system, which AT&T switched to as part of a power-saving agreement with Consolidated Edison. In

with Consolutated Edison. as making the switch, a power surge aided by an overly sensitive safety device disabled rectiform, which convert AC powefrom diesel generators to the DC current used by telephonswitches. As a result, power wadrawn instead from emergency

Normally, such an event would have been easily corrected in the air-hour window pronicians were in a tra elsewhere. The FCC did not a, but a sebut it did direct the c

LTHOUGH

ties such as Thomas Street will continue to

be subject to major, catastrophic failure. a written statement sayin whether it would continue to take service from electric this time the power-saving agreements. It also directed AT&T produce a comprehensive report on the status of power systems alarms systems and, emergent processing as at al AT&T office and to produce an amphysic of the valuerability of AT&T's east network to disruptions with steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of any other steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of a steps it plans to take to avoid of a step it plans to take to avoid of a step it plans to take to avoid of a step it plans to take to avoid on the steps it plans to take to avoid on the step it plans to take to avoid on the step it plans to take to avoid on the step it plans to take to avoid on the step it plans to take to avoid the step it plans to take the step it plans the step it

In a written statement, AT&T said it would comply with all FCC requests. It said that most of the requested analyses had already been completed and that recommended actions were

PCCEPORT

Rep. Edward J. Markey (II
Mass.), claims of the Hose
Mass.), claims of the
Mass.), cl

#### Painful results

A coording to the Pederal Communications Communicate proving of the Thatana Street creat in New York or Sept. 19, a "Saltare at those levels" of AT&T — in power conjument, altern spetames and management — led to the following:

4.5 million blocked demestic long-distance telephone calls
 500,000 interrupted interactional calls.
 Lon of 80% of the Pederal Arietion Administration's

phase circuits.

• Cascullation or delay of 1,174 flights, affecting 85,000 sir fin

Introducing NETBuilder combination of power,

Imagine upgrading your network by adding boards to a bridge/router you need never turn off. Imagine your data



moving rapidly from network to network without bottlenecking, thanks to the muscle of a RISC processor. And imagine,
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bulge of video, text and multi-media data.

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# Police use PC-to-mainframe links to keep track of evidence

#### BY JIM NASH

II. An almost impossible speed and flexibility.

parts while increasing the number of product functions. Power goes up. Speed goes up. Maintenance goes down.

And if technology like this sounds expensive, let us reassure you. NETBuilder II's price is among the most competitive you'll find. What's more, NETBuilder II

is the most cost-effective way to add FDDI capabilities to your network.

To learn more about NETBuilder II and the other NETBuilder family products call 1-800-NET-3Com. Or visit your 3Com reseller. And find out how your network can really take off.



# Why be content to run when you



\*CSC2.2 this achieculary to be released in March 1992, 884 DUS to US 2.1.3 Mindows is a tracervert of Microsoft Corporation (i) 1991 ISM Corp.



Going as far as you can go isn't far enough. To truly maximize your computing capabilities, you have to function at a whole new level. That's why we're proud to announce 32-bit 05/2° Version 2.0. It's being designed to let you run 05/2.

DOS and Windows" applications from a single system, with more available memory, true multitasking, application protection and a 32-bit base system that will keep you out in front.

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No less of a breakthrough is the Workplace Shell interface that being designed to remove even more of the obstacles of yesterday's computing environment. This friendly, graphical interface will make personal computing easier than ever and more powerful too. Built-in interactive education will keep you up and running, and there are productivity tools, a high performance file system, games and more. So there's almost not limit to how far you can go.

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### FROM PAGE 53

aga wide

The drawback to standards how long it takes to define and plement them. The Internaal Organization for Star on has been working or ng is the work of a ven-sortium called OSI Netr consortum called USI Net-ork Management Forum, hich has released some stan-rdized network management finitions. Unfortunately, im-ementation of those specificans is very slow. To complicate the situation,

ng number of vendors an enting Simple Network ment Protocol (SNMP), which was originally designed to manage Transmission Control Protocol/Internet Protocol net-works but which has made quite a splash in the LAN intercon-nectivity sector. SNMP lacks functionality but has the tage of being flexible, tai-e and usable right now.

e too much rich food here: trary, we have too lit-ice on the table.

ng to provide a happ They are supporting ds as a way to link up with

functional areas that are near to



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software tool.

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systems Center, Inc. has added support or IBM's LUG.2 protocol to its Network batameer (NDM) product line. The NDM products automate data rensfer for distributed applications. The company announced additional improve-

transfer for distributed applications. The company announced additional improvements, including a new release of NDM-MVS with enhanced [J/O entit support. Priving for NDM starts at \$22,500 on MVS systems. The BM Application Systems(40) version starts at \$1,000. Systems Centre 1800 Alexander Bell Drive Restoo, Va. 22091 (703) 264-8000

Gateways, bridges, routers

Computer Commiscations, Inc., has in-troduced the Intercept/1000 TCVIP-SNA.
The conder connect, local-series actived to remain Transmission Control Pro-News and the Commission Control Pro-Newski Architecture (SNA) bendom-Compusing can interconnect LNAs over distance (SNA) bendom-compusing can interconnect LNAs over distance (SNA) bendom-tion and control to the control to t

Micro-to-host

mate Corp. has begun shipping Ex Windows 3.3.

and product runs under Microsoft concepts personal computers to mainframe hosts. The upgrade decided access to Dynamic Data Exchange Extra for Windows 3.3 costs \$425. Upgrades from previous DOSe Windows versions cost \$75. Attachmate! 1329.15 R 2011.

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Systems Network Architecture

Puture Soft Engineering, Inc. has an nounced Version 3.2 of Dynacomm/Elite its Systems Network Architecture com-munications software for personal com-

potern. Dysacomm/Eite works under Microsoft Corp.; Windows 3.0 and runs midrosoft Corp.; Windows 3.0 and runs midden and the second corp. Windows 3.0 and runs midden and second the second

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# **MANAGER'S JOURNAL**

#### XECUTIVE TRACK



# Harassment issue not burning in IS

Women viewed as largely unaffected by harassment, but activists urge policies be set



### Measuring the payoff from re-engineering

BY CLINTON WILDER

# Harassment issue not burning, according to IS managers

#### CALENDAR

#### gton, D.C.,

Excellence Through Parlarmannes. Oriente, Pla., once, Ausbries, Calf., Jos. 13-16 — Connect Mill.

Doc. 13-15 — Connect Barnett Date Spriness, Stefarille, sup Expensions, Sussen. Mass. (617) 233-5094.

#### JAN 26-FEB 1

. Orlando, Fin., Jun. 27-30 -

#### FEB 2-8

#### FEB 9-15

Computer Graphics W2. Welt Descy World, Orlando. Pia., Feb. 16-12 — Contact: Stedy A. McDonald, Freet & Sallens, Sc., New York, N.Y. (212) 233-1086.

ry, Alberta, Feb. 11-13 -- Contact: Mili-FFB 16.22

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# PRODUCT SPOTLIGHT

# **Mainframes**

There are deals galore these days, and some of them are actually good ones. But be sure to read the fine print without rose-colored glasses

BY SUSAN GANNON

#### INSIDE

Let's Make

Buyers' Scorecard

#### Discounts galore but read fine print

These financial upgrades work well both for vendor and purchaser. It's just important to understand the bottom line: The vendor wants you to buy into its next

nly helpful for any vendor to in services, but there's still a

like you to do is pay now in order to sa later. But without a bottom-line asse-ment of how these new technologies a going to either increase productivity we money, it's difficult to just ad of expenditure. A case in point are two new feat con and Systems Complex,

They also increase the distance per als can be placed from the host to 9 k

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er spart may bring to your face, but are some sub-al reasons to

one reason is cost. dors will negotiate rice, but this is still ogy, requiring a total amp of the data cen-Another reason is

technology. Sysplex is one of I's favorites in its st round of an-

latest round of an-nouncements, but a lot of customers are still trying to decipher exactly what it is. A Symplex — recently introduced into MVS/ESA — is a group of EMS 370/390 systems that are physically connected and use new intersystem softservices to con ate with one another.

As with Escon, the most important as-

Not every new fa foggy. On all machin higher than over he

or EX line. The 3. Added on the line can link up rocessor wis the fiber-optic-based a. This silows sections of a Cystem to be placed up to 50 meters fiering a let of flexibility in data uniquenations.

rs to

Users would like the following functions add to their mainframes, according to 163 users surveyed for Buyers

#### Machines to watch

muschines.

Frough the Enhanced Performance customers can pay to record to 15% more performance processor. This pushes American in the performance front in the performance.

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# How to get right machine at right price

uniments. The percent annual mine your range of alternatives the mation instructions are second (MITS) would place 100 MITS or lower, your section of the product like, and the product like and the product your like and also desired the product like and like

Find out if they really need the latest functionality or if they are just trying to keep up with the competition. Very often, if a bet-ter to be left behind in the tech-nology curve than to pay premi-um prices for the latest

Consider older platform When a vendor announces a new product line, it will often retrofit

some of the new functionality to the replaced machines. Chances are you could purchase such a machine either used or at a sig-nificant discount.

Prepare yourself to negotiate price. Research the latest dis-count rates and used prices for a comparable machine. Keep in-formed of recent acquisitions in

Once you've determined the

F YOU DON'T like the first bid offered, don't take it. Large-systems play-ers will be willing to renegotiate if it means another chance at winning the deal.

third-party players. It's time to start hagging.

Even if you have a long-standing relationship with a wendor, don't be afraid to call in the competition for a visit. In today's pre-cooker environment, breat of losing an account is periously. Use it to your

" If you ston't like the first bid that's offered, don't take it. In most instances, large-systems players will be willing to renego-tiate. Everyone will come back to the bargaining table if it means another chance at win-

en purchasing new equi ties or free educational services especially if the vendor is draw-ing a hard line of hardware dis-counts. These savings still pro-vide relief to the bottom line, and that is a

tells you that "no one is receing that type of discount." Fi

Try to avoid locking in with one vendor. Do not negotiate deals that obligate you to pur-chase future upgrades, even if it means discounted MIPS. If the deal sounds too good to be true,

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# Ten reasons to stand by your mainframe

There's a lot of talk about offloading ap-blications from the mainframe to small-er platforms. But there are also plenty of o faliforms. But there are also plenty of uninformed inhands around — perhaps wen exough to make up a majority of in-romation systems folk. In a recent sur-ey of 163 mainframe users conducted or Buyers' Scorceard (see page 70, 84% aid their need for mainframes has in no cay decreased because of applications countains, with only 15% assuoring to constains, with only 15% assuoring to

ine contrary.

Computerworld asked Richard Lewis, director of 18 at All-Phase Electric Supply Co. in Benton Harbor, Mich, to list his reasons for sticking with the mainframe through thick and thin. Here's what he has to say on the matter.

To hear the industry has ead cry, central-ized processing—with a maintrame at the heart of it—indexd.

That's anything but true it our compa-ry, a \$500 million nationwise decirried whole-sing distribution basiness. For un-ansistirance is the only distform we would trust to run nearly all our mission-critical applications. In Eart, I can coust at least 10 reasons why we'd absolutely, positive-by settlies no robing lesses.

We made to handle massive transaction volumes. To say that our business in "compari-enterse" is a West business in "compari-enterse" is a West profiles on-line fait a prossing to a 100 mg/s. The comparison of the comparison of the 100 mg/s. The comparison of the comparison of the 100 mg/s. The comparison of the compa

We want to shield users from system issues. We have 1,350 terminate 1100 location in the wareholder branch locations in 20 states, which means that show there out of every four means that show there out of every four frame. Because each terminal transmits one transaction overy four minutes, the clear that these users do not have time to deal with the systems administration chomes that would be nocessitated by even the smallest distributed unit.

The mainframe keeps our IS sta down. According to a recent study arthur Andersen & Co., the trend in distribution industry is for IS to claim % or more of gross sales dodlars. We creatly support the IS function with 1% our sales dollars — a great testimony the proficiency of our mainframe.

We need to ensure that data is tamely, secure and accessible. Be-came it offers a single repository, a trame it offers a single repository and system consolidates and protects data, al-lease it to be underted and access. To get the same time to be under the same third of the security of the same third of the tegrity and accessibility is a distributed environment, we do need complex and en-course-streamive software and communi-cations furtisher.



neo'a Lewis says, 'We currently support the IS function with 1% of our llars — a great testimony to the proficiency of our mainframe'

very committed IS profession

In contrast, vendors of lower price estrop and distributed systems and ap-ications are more likely to put the bur-en of migration onto the user.

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#### **BUYERS' SCORECARD**

# Amdahl and Hitachi lead the pack



#### **Mainframes**

fact scores reflect as

Product	Highest ratings	Lowest ratings
Amdahl 5990 and 5995	Reliability Compatibility Overall performance	Networking support Acquisition and maintenance cost Memory access time
Hitachi EX Series	Reliability Overall performance Compatibility	Networking support Cache performance Memory access time
IBM ES/9000	Reliability Floor-space requirements Compatibility	Networking support Cache performance Cost per cycle
IBM 3690	Reliability  Compatibility  Service and support	Cost per cycle Floor-space requirements Environmental controls
Bull HN DPS 90 and 9000	Reliability Capacity Overall performance	Networking support Acquisition and maintenance cost Environmental controls
Unisys 2200 and A17	Reliability Overall performance Ease of operation	Networking support Acquisition and maintenance cost Cost per cycle

BY MICHAEL L. SULLIVAN-TRAINOR

uyers of big iron have sor thing in common with b

categories ugh significantly lower the possible score of 100, the t well above the mean score of 82 for

points; IBM's 3090 series, fourth with 81 points; Bull HN Information Sys-tems, Inc.'s DPS processors, fifth with

80 points; and Unisys Corp.'s 2200 and A17 series, sixth with 79 points. All series, sorn with 19 points.
Thirty users were surveyed for each product set. Overall scores were derived by multiplying the ratings each user group gave its own product family by the importance factors all users assigned to

Amdahl's users rated its p

#### KEY RATINGS

Amdahl's 5990 and 5995 split the highest scores in key ratings categories with IBM's Enterprise System/9000 line. The ES/9000 models edge ahead in reliability, performance and compatibility, while Amdahl's machines top capacity, service and support and cost.







9.0 Sufficient capacity











#### A CLOSER LOOK

Annually tops five of nine closer look categories, while IBM's ES/9000 scores highest in two, and Historii's system tops two categories as well. IBM's 8990 places last in three categories - environmental controls, ease of operation and floor space - and the ES/9000 places last in one.







Verbatim

#### What do you see as the strength

U.S. market share 1991

tal value of large sys (in millions of dollars) IBM ----- 817,570

Amdahl - - - - - - 83,373 Unisys ----- \$2,781 Hitachi - - - - - - \$1,137 Bull - - - - \$408

#### METHODOLOGY

**ACKNOWLEDGMENTS** 

#### **BUYERS' SCORECARD**

# Amdahl and Hitachi lead the pack

#### Mainframes

fact scores reflect average user ratings for all sured areas, weighted by user-assigned

Product	Highest rotings	Lowest ratings
Amdahl 5990 and 5995	Reliability	Networking support
	Compatibility	Acquisition and maintenance cost
187	Overall performance	Memory access time
Hitachi EX Series	Reliability	Networking support
-	Overall performance	Cache performance
	Compatibility	Memory access time
IBM ES/9000	Reliability	Networking support
100	Floor-space requirements	Cache performance
. [14]	Compatibility	Cost per cycle
IBM 3090	Reliability	Cost per cycle
	Compatibility	Floor-space . requirements
81	Service and support	Environmental controls
Bull HN DPS 90 and 9000	Reliability	Networking support
90 and 9000	Capacity	Acquisition and maintenance cost
80	Overall performance	Environmental controls
Unisys 2200 and A17	Reliability	Networking support
	Overall performance	Arquisition and maintenance cost
79	Ease of operation	Cost per cycle

#### BY MICHAEL L. SULLIVAN-TRAINOR

uyers of big iron have some-thing in common with bar--hunting car consume

There is no greater evidence of this nilarity than Amdahl Corp.'s score in emputerworld's mainframe Buyers' Scorecard. Thirty users of the compa

The primary areas of strength for the ndahl products were cacity and cost per process-

5995 processors scored a

across 15 categories, score
Though significantly lower
than the possible score of 100, the total
is well above the mean score of 82 for

is went above the mean store of the group.

The other products rated included Hitachi Data Systems Corp.'s (HDS) Models EX 60 and higher, which came in second with 86 points; IBM's Enterprise System/9000 series, third with 84 points; IBM's 3090 series, fourth with 81 points; Bull HN Information Sys-tems, Inc.'s DPS processors, fifth with

80 points; and Unisys Corp.'s 2200 and A17 series, sixth with 79 points. All series, sixth with 79 points.
Thirty users were surveyed for each product set. Overall scores were derived by multiplying the ratings each user group gave its own product family by the importance factors all users assigned to

#### to base 100 (see methodology next

ndahl's users rated its p

channel costrol and effective acks performance. Last place ratings for the 3090 included cost per cycle (6.8—the lowest rating in the survey), case of operation, efficient environmental controls and reasonable floor-sec

Bull's DPS series received good enough marks from its users to earn a second place in capacity. Grades for cost percycle, efficient cache performance and floor-space requirements were challenged by the control of the

Unitys' processors were rated sec-ond in ease of operation and fourth in overall performance. However, the products rated last in seven categories, including reliability, capacity and ser-

#### KEY RATINGS

Amdahl's 5990 and 5995 split the highest scores in key ratings categories with IBM's Enterprise System/9000 line. The ES/9000 models edge ahead in reliability, performance and compatibility, while Amdahl's machines top capacity, service and support and cost.





9.0 Overall perfe



9.0 Sufficient capacity







8.7 Reasonable cost per processing



#### A CLOSER LOOK

Amdahl tops five of nine closer look categories, while IBM's ES/9000 scores highest in two, and Hitachi's system tops two categories as well. IBM's 3090 places last in three categories – environmental controls, ease of operation and floor space – and the ES/9000 places last in one.



Loyalties

#### How likely would you be to purchase this product again?

Arndahi
Response base: 39

Likely
The
reseases:
Cost/
Performan
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reseases:
Nameber of
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Hitachi
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The reasons Cost/ Performance Treasons Never reasons readeds respondents

name phiestralically assent were saided a

IBM ES/9000

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resease
Relable, cost
performance
Unificity
The
resease
Number of
respondents
Ungerde

**IBM 3090** 

21 Part of the reason of the r

inspect by American

Verbatim

#### What do you see as the strengths/weaknesses of this product? (Remoss are based on most frequently stated responses)

Lilices Reliability Cost/performance ratio Excellent support

Reliability
Cost/performance ratio
Compatibility

Districts
Incompatibility
Too expensive
imited packaged softw

neive Processor too am red software Weak network serv Likes
Relability
Cost/performance ratio
Ability to upgrade

Limi

Bull

Ultes

Powerful processing

Ease of use

Reliability

Likes
Ease of use

Reliability
Overall performance
Dislikes

Incompatibility imited packaged software

#### U.S. market share 1991

Total value of large systems (in milions of dollars) IBM ----- \$17,570

Amdahl - - - - 83,373 Unisys - - - 82,781 Hitachi - - - 81,137 Bull - - - - 8408

surce: Computer Intelligence/Infocrep

educts rated in Computerworld's Buyer orecard on mainframes were selected has the market share of the worders in terms.

The minimum number of respondents is each product group was 30. The survey was on ducted and tubulated by First Market Researc in Austin, Texas, using a random compile of unnames.

Forty-seven percent of the responden

were information systems direct agers, 24% vice presidents, 6% and 7% other. Nusety percess of the responsers evanund recommend vendors for mainframe procts, 80% determine the need for such products 17% set standards for the organization, and 83% elect vendors.

Ninety-neven percent of the respondent have been avoided with maintrames for five more years. The remaining 3% have works with them for one to four years. Forty-one perconst of the respondents wo at companion, with more than \$1 billion in rev

mac. Twelve percent are at compan twenn \$500 milion and \$1 billion in re-Total acores, which were weighting to the criteria that all responde sean scores all users assigned to the impore of each criterion by the mean scores each group gave to its own products. The final scores were then converted to base for clearer comparison.

#### ACKNOWLEDGMENTS

and organizations for the assistance provided a proparing this Buyers' Scorecard: Sandy Gast Computer Intelligence/Inforcery; Sunsa Gasano Technology Investment Strateges Corp.; an John Logan, Aberdeen Group.

# Late-model mainframes1

9400A	PRODUCT NAME	CATE PREST SHIPPED	PRIMARY MARKTS	MOST COMPARABLE SYSTEM	NUMBER OF CPUS	MEMORY BANGE (8 YTES)	CACHE CANACITY (BYTES)	MACHINE CYCLE TIME (NEIC)	NUMBER OF CHANNES/ CHANNES, SPEED (BYTE/SEC.)	MAXIMUM DISK CAPACITY (STTE)	PERFORMANCE (MIPS UNLESS OTHERWISE SPECIFIED)	высоничисть	SUPPORTS ETHERNET OR TOKEN RING	OPERATING SYSTEMS SUPPORTED	PISTRIBUTION CHANNELS	Disk Mild	MONTHLY MAINTENANCE PER POR PROCESSOR
100	2005 200A	***	II.	204 12/0000 9022 makin	,	## ### ## ###	1360	ж	III	-		M	1	MOVE, THE THY. UTS	-	ST. MARKET -40 FOR	\$17,000
-	100.004	-	ar.	EL PARTIE DE	•	64 SUM 64 SUM	ME	м	2 00.00			ж.	Det .	THE UTS	Dect	SCHOOL SECTION	97,794
	DOOR THEA	-	CLIP.		-	04: E.P.	2048	30		Optional	61	NA.	200	HATE THE	Diest	to the case of the land	90,580
	5000-700A	***	air.		,	1384-16 64:36-	HAT.	30			•	×	Det .	MYS. THE THY. UTS	Diest	SE,500,010 with 12000 leptor of main storage. Of channels	\$16,663
	2006-1100A	***	OLIP.		,	1384-10 64-16-	MAX.	16		-	-	*	Beh	MYS. VAL. THY, UTS	Street	\$7,517,371 -06 1984 \$45.07 371 -06 1984	814,350
	1000-14004	***	ar.	State Comments	•	1384-16	pian.	16		Understand	105	MA	-	HYS. VIII. THY, UTS	Dieset	10,000,000 valo 12000 lyrus of main storage. 64 classical	\$18,305
1.	1000-3056A	13/01	CLTP.	201E/000 000	•	2504-16 04-66-0	766K	6.5	170	Outrain	143	XA.	bea.	MYS, THE THY, UTS	Direct	\$14,300,791 with \$5600 bytes of main strongs, 130 channels	171.00 103.70 107
1	3096-650AA	1501	CLTP.	BH E. WHI	•	25006-16 man during. OM - 6G av- punded manage	1M	6.5	136- 2504-586 tor pacific downs, 1756 for faces downship	(Marine)	104, 504 with Entered Pro-	**	-	TIPP, UTS	item.	\$17,500,825 with 25686 bytes of man storage, 158 channels	136,573 136,443 106 107
	5996-665QA	98	CLIP.	EN ESPON SEL	•	III. K	1,556K	4.5	126- 5234-086- perilei chance, 1754 for Born	Understand	348, 280 web 877	XA	hei .	HYP. VIE	Died	201,971,244 sub 21234 lytes of main storage, 128 channels	E36,274 640,364 with optional
	3005-300A	Gra-	CLTP,	201 Et/1000 1001	,	HIM-K	24	4.5	116- 5254-5866- pendel demand, 1756 for Estimate	Culinbed	316, 357 +10 327	XA	20	TIV. UTS	Disect	\$10,000,451 with \$1,584 bytes of main storage, \$135 channels	MS.MI MSLITT With optional
d Di Internation etecs, for em pas esse	DFS 9000/61	L/91	CIP.	State State	,	138M - 512M	138E -	NA.	SAVESM .	10-	MA	HETE.	Deta .	60061	Direct	\$3,900,000 with 12000 lytim of owner?	\$4,500
	DPS tooqui	ries	CLIP.	25/1000 Made 820	,	138M - 512M	NAT.	NA .	1	16.	ж	HALF	M	60051	Direct	\$4,950,000 with 15084	\$11,564
	DPS PROBERT	1/01	CLTP.	Min ES/1000 Miner 630	*	256M - 1G	254K - 134	NA	1	16.	×	MSDC. HALF	2en	00051	Direct	\$7,000,000 was 200% bytes of manny	\$13,000
	DPS 9000/90	1/91	CLTP.	The Styreen Made 730	*	1386 - 5120	394K - 512M	NA.		16.	XX	SINDC, NO LP	ha .	CCOST	Direct	\$0,370,000 with 254M bytes of sunsery	\$33,611
nated Date Corp. 1001 Self-0430	Cylur 20005	400	CLTP.	Larger than twice the little 2006-100	,	1386 - 51286	1.04	2.4	30-30/5M -	7.51	SZ-O (per processor)	1,500 TF1 DC, 12.0 LP, 11.7 LL	Pitered. PEGE	HOSPAR	Direct	\$2.500,000 max 13000	\$5,000
1	Cylur S000V	400	107,100		•	138M - S18M	1.00		10-36/3M-	7.ST .	M.2 (per present)	LSO TTI IC, 20 LP, 14.7 LL Ga	Etherset. FEGS	HOWE	Desct	\$2,790,000 can 13004 \$700 of courty, 30 \$700 of courty, 30	85,000
*.	Color 1172	-	dir.	100 3000-130, VLX 0000	1-8	\$4M - \$150M	**	11.2	20/2664	7.ST	)1.4 (per present)	MPLOPS UP.34 MPLOPS UL	Pitered. PIEZ	HORVE	Clinat		\$1,612
	Cytarse	5/80	air.	WI 2000-130,	3-2	1300 - 513M	MX	112	30/deset	7.31	)8.4 (per percenta)	MITTERS UP.34 HETERS	PECE	HENT	Died		\$1,656
	Cyler 20000	400	ar.	Mari Elypotes Marie 436	,	51254 - 2G	SLEE	10	1,234/206	7.88	116 (per processo)	1,500 TPL MOTAGES UP,1311 MPLOPS	Diament. PCEE	HOLYS	Direct	\$2,500,000 vin 12004	\$5,300

\*All products lated they disposed or two assuments that plants 1999. The exceed performance relige, based on the following industry-dashed bandwards: CD:—But Conference and 959 subsected response; LF — Linguist, Clorid 1991 1991 1992 processors and \$57,000% LC:—The content is a \$55,000% LC:=The content is

BNDOR	PRODUCT NAME	DATE FREST SHIPPED	PRIMARY MARKETS	MOST COMPARABLE SYSTEM	NUMBER OF CPUS	MEMORY RANGE (SYTES)	CACHE CAPACITY (SYTES)	MACHINE CYCLE TIME (NEED) .	NUMBER OF CHARMES/ CHARME SPEED (BYTE/SEC.)	MAXIMUM DESK CAMOTY (STTES)	PERCENTER PROFIDI	BROWNEG	SUPPORTS STHEMAT OR TOKEN SHAG	OPERATING SYSTEMS EUPPORTED	DISTRIBUTION CHANNES	BASS PRICE	MONTHLY MAINTENANCE PER FOR PROCESSOR
Opini Equipment Arthur 2003 667-6422	MI TON	Man .	ŒŤ.	Der Erfenne	•	STEEL SC	SUN	16	1,394/SM	7.87	107	XA.	-	-		100 Marie 100 Ma	60,305
	W.X sees	401	27. G.17.	SEAL EXPENSES Market SEA	•	DIM-10	3486		1,254/894	7.87	79	NA.	10	750. One.	CORN.		210,000
Suchi Data Systems lerg. 1970-1990	MDS EX perior Made 11	1/41	CP. SE	204 EN-1000 , Model 150		30M - 57 6M	208		C. Marie.			×		VIEW VIEWERA MOVEMA MOVEMA VIEWERA VIEWERA VIEWERA VIEWERA VIEWERA VIEWERA	Dest	E391,000	9497
	MAG EX series Medic 22	1/91	DP. SE	IIM 25/2000 Made 179	1	2004 - 81,034	2000		5-20/50L 4-50L 6M	-	XP .	×	=	VALUESA VALUESA MATERIAL MATERIAL VALUESA VALU	Desert	5341,000	1000
	HEG SE Service Made 27	iat.	DF. SE	HIM ES/1000 Model 780	-	32M - 913M	25K	* :	6 - 33/364, 4.534, 684	Databal	10	HP	=	VILENA VILENA VILENA MYSERA MYSERA VILENA VILENA VILENA VILENA VILENA VILENA	Direct	\$145,000	\$799
	SEDS EX corner Ministra 21, 22	1/01. Obtain 31/1/90 (Model 35)	te. 2	State Styleon Model 216	1	30M - 512M	44X	17-30	6-30/96. 6.556, 686	(Lames	No.	NP -	Bat on mineral manufacture	VALUE AND	Direct	\$600,000, \$772,000	\$1,003
	HEGGEX union bloom 30, 42	1,00	DF.18	554 1549000 Made 207 (Made 34), 25/7000 Made 207 (Made 42)		3294 - \$1294	64K-12	-	4 - 33/364, 4 584, 684	-	HP .	HP	==	THETTA THETTA THE THE THE THE THE THE THE THE THE THE	Client	\$007,000, \$1,500,000	61.5ML 12.399
	HISTI.	7,91	OP, SE	TRACES, MARCON MARCON TO SERVICE STATE OF SERVICE STATE STATE OF SERVICE STATE STAT	,	30M - 61 PM	136K	17-30	5-30/9M, 6-5M, 6M	Dataset	)CF	*	=	YBETA YBETS YBE, ESA HYSESA HYSESA HYSESA YBETS YBETS YBETS YBETS YBETS YBETS YBETS	Dimes	E.ASC.000	\$1,636
	HOS EX	13,50	re. sa	204 300 30E	,	25494 - 1G	SHEE	MS	32 - 139,784 4.594, 694	-		100	=	VINCEA VINCES VINCES SIVE/SEA SIVE/SEA VINCES VINCES VINCES VINCES VINCES	-	\$6,362,000	\$13,72
	HEIGHT merican bilantei 200	401	DP. 16	Disa 25/9000 Model 740	-	356M - SG	-	-	32 - 64/304 4:864, 694	Date of	NP .	No.		WANTED MYSCEA MYSCEA WYSCEA WANTED WANTED WANTED	-	E11,204,000	\$17,86
	HENS SEE	441	CP. 50	Mar Elyano		S186 - 80	134	-	64 - 135/56 6.566, 664	-	107	10		975/854 975/25/ 975/85 936/85/ 936/85/ 936/85/		\$15,000,000	SEC.
	SECO EX section Medial SEC	Grid.	DP. 98	Mark Physios Mark 1990	•	SIEM-90	1.304	1	64 - 136/36 4.554, 694		NP	No.	=	MYSUS MYSUS MYSUS VALSE VALSE VALSE VALSE	Direct	E27,879,409	836,71
	NEWS EX motion Mindal 620	QI 16	te, s	State State of the last of the		51294-96	2.354	1	64 - 138/38 4.586, 686		HP .	100	Data de estado	19627 19627 19627	-	\$30,465,000	E30,8
000 (26-240)	20,/9000. 9227 Madel 130, 130, 15	13/90 06/66 130, 1 150, 0 01 01 01 01 01	i in	-	1	MEX	XA	No.	15 (Manage 1290, 1390, 1590, 1390 (Manage 1790) 1884	*	14-63	No.	-	WYNAME VINAME VINAME ALLIAN	-	SOLAN ENGLIS	1775

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TRABOX	PROBUCT NAME	DATE PREST SHIPPED	PRIMARY MARKETS	MOST COMPARABLE SYSTEM	NUMBER OF CPUS	MEMORY RANGE (BYTES)	CACHE CAPACITY (BYTES)	MACHINE CYCLE TIME (NAIC)	NUMBER OF CHANNELS/ CHANNEL SPEED (BYTE/SEC.)	MAXUMUM DISK CAPACITY (BYTES)	PERFORMANCE (MIPS UNLESS OTHERWISE SPECIFIED)	BINCHWARKS	SUPPORTS ETHERNET OR TOKEN RING	OFFICE SYSTEMS SUPPORTED	DISTRIBUTION CHANNELS	DIM RVI	MONTHLY MAINTENANCE FEE FOR PROCESSOR
BH (emi.)	ELFOOR. 5121 Models 190, 116, 200 320, 440, 460 647 cmd	1,911 Obedel 21-0, 3911 Obedel 190, 190, 190, 190, 190, 190, 190, 190,	CIT.	MA		61336 (Mindel 1901 1G Objects 210, 200, 339, 440 480)	SA.	NP	32 Objects 1901, 48 Objects 210, 360, 230, 440, 480, 1004	M	61-363-	100	-	MTMESA VALUESA VALUESA ACCUESA	Diesex	\$575,000 - E3,120,000	85,100 85,100
	20/40000, 90021 Medicile 340, 5600, 5600 600, 7200, 6000 600	200 M	0.17. 18	NA.	1-6	1G Obstat 540, 1.75G Obstan 140, 580, 4.5G Obstan 130, 790, 9G Obstan 130, 900)	XA.	NT.	64 - 254/1896	**	278.0	NF.	-	HYSPESA. VARESA. VSC.ESA. AUX/ESA	Dieser	\$2,129,000	\$2,775 \$30,340
CL 913-440 913-223-1391 EC. Season Onto 948-7200	Serve 86 SX 580-20	***	OLTP	TRACES - 660	2	254M - 1G	NA.	114	32/5M	127	*	323 1775	Edward .	XPG3	David.	\$4,387,000	\$2,340
	Serum 30 SX 560-00	2/90	DP. GLTP	EM ES/0021-500	,	256M - 768M	XX	11.0	34/504	1.97	60	220 TFS	Distance	NAG.	Deut. Wil	\$4,213,000	30,300
	Serve 89 SX 510-20	1/91	DF. OLTF	EM 25/9011-500	2	1204-51256	NA.	11.0	36/5M	1.27	46	153 175	District	AME.	Dino.	\$2,306,000	\$4,650
	Serves 30 SX 480-20	1/91	CATE	EM ES/9021-340	,	11804 - S13M	KA	13.0	16/504	1 27	29	113775	Edemet	YME.	Deed.	\$2,156,000	\$3,700
	Serve 80 SX 450-10	1/91	DF.	ERM ES/4021-330	1	64M - 256M	NA.	13.0	NSM	127	n	23 175	Ditemet	VME.	Direct.	\$1,636,000	\$2,500
	Series 30 SX 430-16	1/91	OLT?	ERM \$5(9123-260)	1	64M - 256M	NA.	11.0	45M	127	15	63 775	Distance	VME.	Denis.	\$1,175,000	\$1,700
	Secret 30 DIE 270-80	\$/01	DP. OLTP	TRAN AS/400 DRO	1	3296 - 12996	ME	190	30/5M	1.27	6	25 175	Etherset	VME.	Daniel.	\$382,000	\$350
	Sense 80 DIE 130-80	9/90	DP. GLTP	IBM AS/400 DG0	,	32M - 158M	NA.	150	20/5M	1,27	45	23 775	Ethemat	VMI.	Direct, WAR	\$309,000	1271
	Server 80 DT 200-15	3(41	DE. OLIT	DIM ANNO DES	1	1EM - 04M	HL	100	4/SM	1.2T	3.5	16 175	Edward	YME.	Denct.	\$136,000	6130
	Secon 39/04 190-30	9/91	DE.	BM AS/400 DISC	1	30M - 128M	ж	390	10/584	1.2T	3	15 175	Edwaret	VME.	Denet.	\$155,000	\$230
	Seem 30 EEE	9/91	DP.	TOTAL ASSESS DAS	1	18M - 64M	NA.	100	6/5M	1.2T	2.5	AI TPS	Edward	VME.	Direct.	899,000	990
	Serus 30 TIX 120-16	9/91	DP.	ISM AS/460 DOS	1	16M - 64M	NA.	120	6/5M	1.27	1.5	# TPS	Ethernet	VIGE EPG3	Direct.	\$73,000	\$60
CR Corp. S120 445-0000	130-16 HCR Springs 3000	12/61	OLTF.	NA.	Cb-10 256	11004-6.96	•	SSMH-50 MHs	XA	HOM	2,000	iu.	Seat.	Day Traint	Deck.	\$2,000,000 to two	\$14,000
	HCR 3060	13/90	01.77.	September Princeral	•	16M - 512M	154K	**	ж	HOM	80 - 339	NA.	Bed.	Union 4	COM.	EPE, 150 for 250 MEE, and planted SCSE subples, 2500 forter tipe 6000	\$30.7
Transa Componer, Inc. (300) 460-3000	TATOON Comments Francis Season Market 27000, 2000, 20000, 2000	5/00	01.17	BMC1000, VAI 2000, Tandon Cycline	1	64M - IC (Authorit)	15M-6H	di .	2-31394M	1 NG - 249 NG (shapknand)	МА	\$300 250 200, 250 200, 250	Medicate our Obode 23903 1,005,034 TPS medicate our Obode 28603	Was .	005 005	62:00 .000 - 50.150,000 - 50.150,000 - 50.150,000 - 50.150,000 - 150.00 - 15	\$4,666 (2340), 19,075 (3460), 113,530 (3446), 117,934 (2860)
	Contract	Mar	OL TO	EM 25/0000	16	GUM - NC	1M - 604	NA.	1-165M	4 - 400G	ж	×	240	-	COM.	SESS. DOS VID TWO CPUs, SAME lighter of manage, 30 GO dates	61,147
4001 200-0000 luique Corp. 2130 1000-0307	2000 meren/ 4600/C	741	OLT	IBM ASAMO, ES-0021, 5121	1.6	32M - 64M	14X	NP	4-343.IM	et	м	107	Edward	OS 1130	Disect	\$301,534 1 IP. 3254 bytes of manage, they	S270 ke the
	2200 series Mudal 000ES	1/50	DP.	15/0021, 6121 1984 15/9121. 1982	1-4	3056 - 138M	2568	RP	176/3 1M	24T	MA.	NP.	Edgrant	OS 1100	Clinco	EL301.00 1 P. 200	\$3,6164 Bit option
	2200 series Media 900	600	DP. OLTP	SIM ESPAIN	2-6	254M - RG	til pe D	NP	384/3.1M. 4.5M	set	XA.	307	Etherset	OS 1100	Direct	\$4.400,464 T.P. 15404 bytes of amounty, might channels	SA.STOR
	MA 625 CCP Offices A.A.	L/91	OLTP	SDM AGUEO Models 25, 69	1	12M - 36M	NA.		1/1.2M	2864-140	**	TPCAT SE TPS LISS TPS 21.60E) TPS 22.50E) TPS	Sec.	MCPSAS	Direct.	\$16,000 with 1256 bytes of sensory, one channel, one type drive, 20056- byte disk.	HP
	A service Market Ann	9/90	07. 01.17. 38	25A 25,4400	107	486 - 1.5365	NA.	16, 38	64/3996	1.57	E.2-95	mains	Zedi .	MCFSAS	Direct	Stock and - 10 year and with delivery of many, two dames	ж
	Areiro Made Alto	15,00	OLTP.	BM ESPORTI Model 100 - 900. Reach EX330/ 430, Amelial 2005 M norm	1-4	96M - 1.3G	NA.	16, 30	2548/1004	5.86	51 - 340	ж	len.	ман	Direct .	\$5,275,000 with 5654 \$25,540,000 with 5654 bytes to 19554 bytes of	NP
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## IN DEPTH

## The choice is yours

Four steps to getting the enterprisewide LAN operating system that's right for you

BY ROBERT LEM

multinational engineering com ny, which operates in more than states and three countries; want that would support the distribustructure of the organization. I firm planned to use the localnetwork environment as a platfe to launch its information systesion between the countries.

The company had, over the years, compiled a variety of systems and networks: centralized IBM Application Systems/000 and computers representing 25 different was over and three incompatible LAMs in separate district offices. At this point, its goal was certablish a compatible LAMs in expinate district offices. At this point, its goal was certabled as compatible LAMs in a certable in compatible LAMs in a comtraction of the compatible LAMs in a certable certable in the compatible LAMs, provides access to the ASMO and establish backbox for father enterpriservite compating. The firm also sure the establishment of, LAM standard as a way of minimizing the

flow of divergent technologies into it.

The IS chief at the company was faces
with a critical decision many of you are deal
ing with today: choosing a network operating
system standard for the enterprise. The
choice is key because although your selec-

Lem is a serior associate specializing in local- and wide area network configuration and planning at contion of network topology and architecture is important to the LAN implementation, the network operating system plays the biggess role in determining the LAN's functionality manageability and — the ultimate test — acceptance by end users.

How to know when it's right How do you navigate your way through a the product offerings and pick a LAN operaing system for your distributed enterpris-How do you know which product has ti

The best way is to be structured shout it.

Try using a four-step approach that is both
quantitative and qualitative:

1) Deserted and rate evaluation criteris.

 Define the current and future operating environment.
 Identify and evaluate the network alterna

Identify and evaluate the network alternatives.
 Test and prototype target products.

You can begin your search not an enserprise LAN by pripositing specific criteriayour choice must adhere to. Most companies find that setting up an evaluation committee made up of IS staffers and business end users can streamline the task and ensure that we'll set a more halanced view of what your

coal light a more basineds view of war company actually needs.

One important charter of this committee is to talk to and survey IS and business



Specific criteris that you may come across include need for a mens or graphical user in terface; case of installation; acope of vendor technical support; ease of LAN management and administration; cost, speed and performance; wide-area communications capabiltice, ability to access other computing plat-

abilities; ability to connect va workstation types into the LAN; global naming services; printing capabilities; and unorade and en-

ing services; ting capabilities; upgrade and encement options. It this point, ill want to cateize the criteria prioritize them, ch will make the ection process

says o'coldec' and more conducted and conducte

a streeting the LAW science

Once prosped, the imprint criteria a compariground up with on the weighted in service insportance by the evaluation committee. The committee among the comparison of the carbon committee of the committee and the committee of the committee among as weight number to each element on a scale of 1 to 5, with 1 being the lesst important. This allows criteria of An a ratio of thembo, criteria that are visal to short-term gain for example, case of inmalization or those that are no conseny tree and the committee of the committee of the speed and performance) are usually given a neglect of 5. "With 160" criteria that are not all but are desirable (for example, gibbal



· Surveys, surveys, surveys

- Scoring products by their merits
  - · Evaluation do's and don'ts

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The MultiSync 4FG nonitor: the big screen dvantage for windows.

#### NEC

AfteroAge\*

Continued from page 86
office or small conspany, WMN capabilities
may fall in this category) are given a
weight of 1.

The continue these criteria and assigning as importance weight to the myovides a way of streamhining the assessment process by eliminating success
irrulewart to the evaluation.

After going through this process, the
engineering firm came up with the Thy 3
Businesses.

ble vendor with established techn rection and international presence.

port for multiple workstati e, Sun, IBM PC and others). e of local and remote netwo

ratewide vendor technical sup-

on process consists of defining the oper-ting system environment, which will nee you naturally into Step 3, selecting a notice set of LAM atternative. A com-on configuration will be the base against hich to compare alternative operating stem products.

accan products.
The engineering company defined its vironment by conducting a series of invivers and surveys at various manage that and operational levels. It used come analysis tools such as data-flow grams and organizational clears to crucia general model of information flow,

	100	-
es	Date:	-
	-30	Œ

Criteria	Weight*	Score	· Weighted	Score	Weighted
Mean or graphical user interface	4		16	2	
Easy to install	5	5	25	4	20
Vendor technical support	2	3	6	3	6
Easy to manage and administer remotaly		5	20	3	12
Total score		A	67	-	46

needed to share accounting, sakes, marketing and engineering data at the district, divisional and home office levels. In addition, the district offices needed to scess the contralised financial network for apyroll addornation. These mendatory scess paths outlined the firm's need for a distributed LAN architecture that would allow access to all points of the organization. By defining its operating environment, a company path is LAN selection into a business framework.

Beneath the surface Selecting specific LAN products for re-view involves some digging. Finding out which products address the majority of your criteria and fit into your operating environment is an investigative process based on research, input from a wend-current and former customers and word-current and former customers and word-

current and sormer customers any war-of-mouth recommendations. Mouselings with vendors that are strong candidates, providing them with the evaluation crite-ria and typical operating environment to study before the meeting. This allows candidates to zero in on areas of key im-

port to you. However, make sure you understand vendor claims about how well their products meet your evaluation criteria. In the case of the engineering firm, it asked wendors to put together a demonstration of their products' AS/400 connectivity functions to verify claims. It is better to find product weaknesses now rather than after you have installed the LAN. er you have installed the LAN. At this point, you should set up a scor-

ing matrix (see chart above). The matrix should list your weighted criteria as well as the score you give each product in terms of meeting that criteria. That score is based on a 1-to-5 cacle, with 5 given to those products that meet the criteria best. You then multiply criteria weight by product score to get a weighted score for

rech direct.

The engineering firm's evaluation committee gave nows to each work of had on in short the based or evaluation and the short of the short in the evaluation, based on meeting criteria short as multiple pictory access, remote network management and stable matter possible ma

Vines AS/400 connectivity and network management capabilities — that product got the go-ahead.

Choosing from the myriad options in the LAN marketylace need not be like walking blindfolded through a minefield. In narrowing down your options based on your needs, you can come up with a much mailler and hence more manageable set of systems from which to choose.

This wronces is not reserved only for

of systems from which to choose. This process is not reserved only for selecting the big-boy vendors; it can help you decide among lesser known products that may be more appropriate for your firm. This approach will help you decide which vendor has the right stuff to take your firm into the 1990s.

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Faced with that question last week, computer leasing and disaster recovery player Condictor, line, cause up with one checitive nanwer: Get out. The company has hird consultant First Botton Corp. to belp it weit its oil and to go investments in the part wit its oil and to go investments in a man said. In addition, roings of \$69 million,

#### End of an era

End of an era

Sumyvale, Calif.-based Advanced Micros Devices, lanc.

Anneed Micros Devices, lanc.

Anneed Micros Devices, lanc.

Anneed Lance Micros Micros Micros Micros Jan.

Calif.-based Acidity known as

"Rab 5" — screation after

March 1992. "The old gives way to the new," said Chairman and to the new of the micros Mi

#### Double up

In a near doubling of its ear-er five-year goals, Midwest re-onal Bell parent company meritech last week unveiled a an to usher 80% of its 16.4

- including voice, da by 1996. Accordi

#### Rill it here

The U.S. House of Repre-sentatives has passed a bill that would modernize the Export Administration Act. It establish-es a "license-free Cocom" sone for the U.S. and 16 allies within which needs "". ed for supercomputers ed for export: The mini-would be set at 25% of the g power of the two

## Technology comes first at Quarterdeck

Firm hasn't changed its 'business-as-usual' philosophy of putting technology before marketing

BY CHRISTOPHER LINDQUIST

SANTA MONICA, Calif.

squeeze.

However, \$48 million Quar-terdeck Office Systems has stayed ahead so far by using a tal-ent for putting technology be-fore marketing — a strategy that is, ironically, something of

no a result, however, Qua releck's memory management d multitasking software pro-ts have garner son multitasting software prod-ucts have garnered a group of loyal, technically savry users. And word-of-musth advertising from those users has translated into top-selling software and a successful business.

Unskappy converter
One usch user is being forced by
his company to leave Quarterpackage for Microsoft Corp.

Body Corp.

Was stable and solid from the

n 1.0 of

May 1987 Descrice Version 2.0, the first program allow the display of DOS text and graphics applicate windows, is released. Descrices 2.0 also uses "high memory to free more room for conventional DOS pr

-faster." egan in 1981 se a part-mong former Citicorp

rentain, as we operate in the con-tral business district, "he said.
Locating the center on DEC's premises also means that DEC's premises also means that DEC's saidf will be on hand to provide prumpt service, including back-ug systems if necessary.
Local shipping business prac-tices, Le Point and, make that level of IS help not just a conve-

some swit

Singapore will be CGM Asin's regional data center, serving about 200 agents in Indonesia, the Philippines, Malaysia, Thailand, South Korea, Hong Kong, Japan and Taiwan.

## French firm outsources to DEC Singapore

BY EDWARD LIM

SINGAPORE — French ship-ping company Compagnie Gen-erate Maritime-Asia (CGM Asia) has become one of the first com-panies in Singapore to opt for outsourcing to meet its informa-tion technology needs.

The commany, which recently

Under the \$588,000-a-year patract, DEC will install, oper-te and maintain two VAX 6000 ampaters in a special computer som at its Customer Support enter in the Tong Nam Build-

uired under a separate contract corth about \$1.2 million be-ween CGM Asia and DEC's of-

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NOVEMBER 18, 1991

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Nell Margolis

#### A cautionary multicultural tale

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ht lead them. strate his point, he recounted ring story. As I recall it, the tale had been deleted to

w as purely ceremon trive — let's call him U.S. — and his South American counterpart and pers host — let's call him S.A. — prepared for several days of high corporate sole

And that's where things began to; th. U.S., knowing that back in the artland, he would have put an hono

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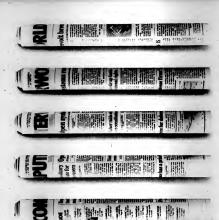
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it, N.J.-based Unix Sys rice, Inc. (USL) has a

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ross process.

For her part, Myers said she is unper-turbed by competition from the big ven-fors. "We're not sitting still," she said.
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#### BY ALAN RADDING



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Manager of Recruiting TelTech Corporation

Specializing in leading-edge hardware and software technologies, TelTech Corporation is an international consulting firm headquartered in New York City. Its major focus is systems development for maintrames, midrange systems, PCs/micros, and robotics, as well as software development and feasi-bility studies. With over 18 years of consulting experience and 250 employees, the firm primarily staffs and manages large team projects in the financial, insurance, manufacturing, and software development environ-ments. Since each TelTech team is typically 85% employee based and 15% contractual based, Pamela Cianci, Manager of Recruiting, advertises in Computerworld to find qualified professionals for both grenos.

"At TelTech we take a tatal solutions approach, managing all phases at a project from requirements, specifications, analysis, and design through coding, testing, imp mentation, and maintenance, Essentially, at means we must custom fit the skill sets of all project team-members to meet the exact requirements of over 1000 client com-panies worldwide. Over time, I can safely say that we look to recruit highly motivoted professionals with virtually every technical and programming skill. While finding experienced data processing professionals has always been key and control areas to always been key are control areas. ways been key, our rapid grawth under-scored an immediate need for o recruitment advertising program. We wanted o medium that would allow us to recruit the right condidates regardless of location. That one me-dium is Computerworld.

"In just a matter of months, TelTech experienced 40% growth and begon ropid expan-sion outside New Yark. Clearly, we needed to find lats of qualified professionals in lots of different areas. By generating high-colibre responses from all over the country, Computerworld's excellent drawing power has helped expand our business into 22 states. We now maintain fully staffed branch offices in Orlando, Florida/Rawell, Geor-gia; Upstate New York's Hudson Valley Re-gian; and, most receitly, Denver, Calarado.

"Each of our Computerworld recruitment advertisements consistently produces 40 or more resumes. And, because Computerworld delivers quality responses torgeted to the exact experience we need, virtually every one is a potential candidate. Once when we advertised for specific expensise on a broad exemple of the second of the control of on a brand new piece af equipment yet to be released, we even found - and hired-twa candidates with that speciolized skill. twa condiciones with mail specialized sixil. Our Computerworld recruitment advertising is also invaluable in helping establish a bank of qualified candidates for future Job place-ments, as we generally receive resumes far manths after each advertisement runs.

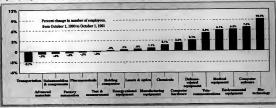
In anticipation of at least 100 new hires this In anticipation of a least 100 new hires mis-year, we're doubling our advertising fre-quency in Computerworld to keep pace with our ever-expanding business thrust. For Tell Tech, Computerworld's far-reaching au-cience, dedicated readership, and long shelf life spell recruitment success."

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#### MANAGING YOUR CAREER Glen Knight

## If you want to manage, start with yourself



Many IS professionals fail to make the transition to management - not because they wouldn't be good at it, but because they didn't think ahead. The time to prepare for a manage-

ment job is not when it's handed to you, but while you are a technician.

Your first priority is to de-cide whether you actually want to be a manager. That sounds simplistic, but it a an important consideration. Many people are attracted to management by the

If you know you are cut out on to a manager, and those chainges don't faze you, you can tart grooming yourself right our for the job you eventually reant to hold. Here's how:

Step 1. Plot your path. For nample, an application pro-rammer may decide to reach a troor goal of chief information

mation systems director. Set a target date for maching each stage. Putting your peals into such concrete terms will help izeep you on track and abert to the need for action when the time is appropriate. Plans must be flestible, of course, Real life doesn't always follow a preset course. Review your plan occasionally and make adjustments where necessary, always keeping the end goal in right.

ght.
Step 2. Talk to your man ger after you have set your sais. This will help in two ays. First, you may be able and out whether the manage as plans to move up, which

FFERING ASSISTANCE will gain you a reputation as a doer and a problem solver who is willing to tackle more than just your own immediate job.

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## Hidden costs can undermine savings from outsourcing

BY CATHLEEN A. DUFFY

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## INDUSTRY ALMANAC

#### ANALYSIS IN BRIEF

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aims & C.D., New SOW, ROSENSOW, 2018.

B Development Corp., and Software Public Corp., shares are no longer recommended see translating DDC-based applications to Minfe Corp. 's Windows 3.0 in proving to be relianced training on both Lotus and Software hing have been downgraded from buy to Microsoft was upgraded from buy to Microsoft was upgraded from hald to buy.

All Microsoft was upgraded from the to load.

Wy change ordings compared to the total contraction of the con

# STOCK TRADING INDEX

#### THIS WEEK'S HIGHLIGHTS

gital Equipment Corp. is exp greement with Microsoft Co DEC climbed 5¼ por

Quarterly sales and net income at Software Too Inc. increased, as did its stock price last week, were up 2½ points to 8½.

## Computerworld Friday Stock Ticker













Before and after



## Computer security battle looms overseas

Experts point to successes in securing systems from domestic attackers, see global challenge ahead

#### BY MICHAEL ALEXANDER

rity profession is winning the battle to protect security sys-tems from attackers inside and outside corporate America, but

corex. "We have met the enemy, of he is us," said Thomas Pel-er, information security spa-aints at General Motors Corp. Petitier lickled off the 18th nousl Computer Security Con-music Computer Security Con-music Computer Security Con-tich was held here last week, tib a keynote speech that ex-ored the circial situes facing e security profession in the

1990s and beyond

overseas, Petier said.
"They will be in your computer in a New York minute and take their Texas time playing with it," be

"growing concern"
use global "networks are ining faster than our ability to
oct them," said Lloyd Tanamanager for international
eting at CKS Software NA,

should serve as our wake-up call to not only the complexities of connecting these large interna-tional networks but securing

## Making Unix Safe

SCHAEL ALEXANDES

## General Motors revs up wide-scale security plan

d in the corporation's co

## OTA says full speed ahead on risky fingerprint project

BY GARY H. ANTHES

ASHINGTON, D.C. — The e of Technology Assess-(OTA) of the U.S. Con-

two hours.

The FBI estimated it will invest \$600 million during the next four years on its fingerprint modernization program, including \$200 million for a new building in West Verginia.

OTA project director Fred B. Wood said the \$400 million estimate for systems includes 300 million for 450 specialized minimum programment of the systems.

uter-class "fingerprint sers." \$100 million for conrolling mainframes and optical and digital storage, \$100 million for telecommunications equip-ment and lines and \$100 million for computers for related crime

The OTA said the impact of the new system on operating costs is not known, but it acfedged that the FBI is as-ng labor productivity will in-te by 50% to 100%. e of the technology, such

of view, the OTA said.

The FBI system will process
volumes much greater and maintain files far larger than exist in
even the largest state system.

By the year 2000, fingerprint
"carrio" could come into the
Cartshour facility for matching
at rates as high as 100,000 per
day, and the detabase will had
you detabase will said
at the orange of the country of the
each person's prints using about
11 Myste of storage.

Little room for error
According to the OTA, the project is risky because "the automation schedule . . . is very tight and allows little if any margin for The FBI expects to issue a re-quest for proposals early next

ess, the OTA

## Microsoft bolsters applications, plugs holes

BY JAMES DALY

Applications galore

DEC, Microsoft link arms on Windows

IMS, VSAM and DB2 and a variety of SQL-compatible database

IMS, VSAM and DRS and a various conductive workers are recorded to the conductive workers are re

European tour

SALLY CUSACE

## **NEWS SHORTS**

Covice, portners win airport bid Cris Cry., Missakais Bestric Cry. and BM Japan together recently was a 12 yealine fall to devide passages informa-tion system for Japan's new Kinsal International Papers. The Figure and Languig distransics through vice and video yea-tens. In addition, the system will handle Right exhaling and passager processing as will an apertain information for in-port, personal. Development in scheduled to begin next search and completely deliver the contract of the hostical specific contracts.

New insiders probe plensted
Attorney General-designate William Barr and hat work he will
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by a congressional panel of "insorrelling" in probe into the disupering and the second of t

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company 173 defirsters.

Microsoft and Banyon team up Tening a page from their competitor's pisyhook, Micros Cory, and Bursyn Systems, lick, here formed a technical or port alliance. Under the part, each will take responsibility support calls their involve the other. Unen alwe long become the habit many computer weeden have of warling their har of problems not clearly caused by their own products. Bany and Microsoft will train each other's support staff, exchar products and share excluded distances.

Mitel clims for wireless net
Metel: Telecommunication Technologies Corp. (Mta) Int
motified a pittine with the Potent Communications Conminion that would enable their content. The potent or all
the FCC is allocate three 50-HE climans, which could fee
be read by portable painting and notebook computer users to
exchange high-pood messages, Mtel 2009.

intel drops print server price intel Carp, cut the price of its Token Ring Netport print ser ron \$1.195 to \$995 [sat week. The chip maker chied mar-pressures as the reason behind the price dray. Netport, who is produced at Intel® activating division in Hilliands, or produced at Intel® activating division for Hilliands. Occuments clients and servers to printers on Novell, I Netween networks over Token Ring.

User-friendly FOIA proposed
U.S. Son, Patrick I. Lealy (D. VI.), chairman of the Senate Sol-committee on Polosology and the Live I has introduced a bit of the Computer age (CV., Agril 26). Becames some agencies bit at providing information in electronic formats, the bill would require agencies to make reasonable efforts to provide government (Stil is whatever form the requester closers.)

## Kodak IS exec broadens scope

BY CLINTON WILDER

ROCHESTER, N.Y. - Eastman Kodak Co.'s landmark 1989 out-sourcing deal is a success by st least one measure: the career track of the information systems chief who hatched the ides.

Last week, Kodak gave Cor-porate Director of IS and Vice President Katherine M. Hudson the additional job of director of IS use acustional job of director of IS and processes for the company's beleaguesed imaging Products Group — Kodak's largest business unit. In essence, Hudson is charged with redesigning that unit's business processes through the use of information technology.

technology.

The imaging unit, which after numerous strategic setbacks has allied itself with IBM, Lotus De-

allied itself with IBM, Lotus De-velopment Corp. and Novel, Inc., will use information tech-nology to shorten product cycles and better gauge customer re-quirements, Hudson said. For Hudson, 44, the new re-sponsibilities represent a return to line management. She began Leo J. "Jack" Thomas, head of the imaging unit.

"Jack Thomas believes in ele-vating the importance of IS as a major force in re-engineering." Hudson said. She said her 1969 decision to outsource Kodak's data center operations, telecom-munications and personal com-

her career as a systems pro-grammer but later ran Kodak's short-lived instant photography unit. Hudson reports to Kodak Chairman Kay Whitmore and to Leo J. "Jack" Thomas, head of

bility of IS in the minds of Kodal's trap executives. It helped convince senior management that IS should be more concerned with business strategy, whe said. "It used to be somewhat embarranting to go into a funitions extralegy meeting audient to \$5 million to upgrade Jan IBM 3000." Haston said. "Usides you can say that owning these boxes is critical to your business, I would let go of them."

them."
A new 189,000-sq-ft data center built by IBM to support Kodak's information systems opened this past summer. Huston raid the outsourcing deal — data centers to IBM.

## Oracle leads manufacturing product blitz

BY ELLIS BOOKER

CHICAGO — A walk past the smoothly running workstations and computer-controlled maad computer-controlled ma-sine tools at last week's Auto-t'91 conference and exhibition suggested a paradox: If U.S. manufacturers have access to so manutacturers have access to so much technology, why are they often besten to the punch by Eu-ropean and Japanese competi-tors?

toral Technologists have badly "underestimated the inertia of [manufacturest] organizational infrastructures," and Joel N. Orz, chairman of Orr Ausociacs, Inc. in Virginia Beach, Va.

In am oppurent reaction to this, Julie Praser, a senior industry analyst at Advanced Manufacturing Research, Inc. in Carnickan Company of the Carnickan Carnickan

HOLLING ACCUSED THE BY THE SECRET WHICH IS IN THE SECRET WITH THE SECRET WE SECRET WHICH IS IN THE SECRET WHICH IS

## Mips unleashes design kit for ACE-complaint machines

BY MARYFRAN JOHNSON

SUNNYVALE, Calif. — Hoping to boost the momentum of the Advanced Computing Environment (ACE) alliance as well as its own revenue, Mips Computer Systems, Inc. will unwell today a pair of do-it-yourself hardware design kits using the R4000 reduced instruction set computing (PSC) doi:

Mips' Reference Arcoystem Program will sell design bits, chip sets, software binaries, source code and technical support to firms using the R4000 microprocessor to build computers compring with the Advanced RISC Computer (ARC) specification from ACE. Pricing will be passed on roun ACE. Pricing will be passed on the passed for certain volume elippossits.

## PC buyers hold out for better deals

Deepening gloom

when we don't wan't be welching many Duty. Hery more days: They dan't led lacks; meet days: They dan't led lacks; them los performs we one chapped on an assemble beautiful to the second properties of the second properties. It is don't the second properties and the company seather in far from our. Lock first speed on the second properties the tomority and second properties the committee of the second properties and the committee of the second properties and the second properties and the second properties and the second properties of the second properties and the second properties and

Amdahl alerts users about defective 6380 K disk drives

#### Software **futures**

## Citicorp overhauls corporate network







#### **TRENDS**

## UNIX SOFTWARE de in of us die al Despite the attention given to commercial Unix use, Unix systems dedicated to commercial applications are not expected to show immediate growth in the near future Major applications areas





CW Chart Marie Blance

#### WEEK NEXT

A ccelerating the move toward open systems is the top management is-sue at EG&G in Wellesler sue at EG&G in Wellesley, Mass. At this Fortune 200 high-tech components company, IS Chief Bob Curran is replacing propri-etary platforms with Unixased workstations and re aligning the information technology groups for greater coordination. See Manager's Journal.



or all the money spent to put immense technology power into compa-nies, you'd think U.S. firms would be more productive. But data shows they're not, and that fact may eventually hurt U.S. global competitiveness. In next week's In Depth, Harvard Business School's Gary in reveals why this is so and what IS managers can do about it.

### INSIDE LINES

When one is better than two

After years of taking heat for minimizing two incompatible by trivate branch exchange lines, Aft it is finally going to much its Definity Generic 1 (Syriem 79) and Generic 2 (Syriem 85) lines at Connect '91 is junuary. The new Generic 3 platform will reportably run on an Intel microprocessor at the low end and a 1 Might Compater Systems IRSC processor at the high end. The latter is said to provide a 400% performance improvement over the Definity Generic Exhips etc.

FOUR ILLE SYSTE.

New York was to think (SYZ is a dead whale), some users as still getting composites to change products ofter it. AST Research's Geneal's France, riverset or protein marketing, as he believes customers who had stopped haying AST is noted took computers have their proceedings closed until AST personaled it would get them certified to run OSZ's Extended Edition. Trader said he expects the notehook to be certified before the end of the year.

And the best gees on

Call to panother in the seemingly endless string of highly placed executives it SIL. Systembouse. The Ottow-based systems integrated is pointed to amounte the arrival of Server and tengrated services integrated services. The Ottow-based systems integrated for services Deviction, to best up and expand Systemsbours's Northeast region, working out of New York. The integrator recently raided Andersen Committing for top-soft talent. That was to suspensing, mice SIL's chief executive formerly was Andersen's No. Epartner.

#### Slow on the draw

Sow on use caraw.

When Lotus announced its upgrade piedge policy, which was to have required users to destroy either the notivare the ways to have required users to destroy either the motivare the upgraded from or the new product after 90 days, Berland wa apparently ready to retailste. But Lotus withdrew the policy before Bardand could begin abhypin is "101 Uses for New Old Copy of 1-2-3" pumphlets. A Borland spokensma said this twodal have included "is footrest" and "a doorstup."

#### Going modular

toning mountain.

No Everse will use PC Expo in Chicagó to formally introdu
its new Tempo M line of modair desktop computers and a
gisht weight notebook computer. He Tempo Carrier. The
Tempo M line will have a pensive baciquiane that will allow
coscot organdes from a 3865X to 33-34Hd 4465IA. The
Tempo Carrier (code-named the Tempo VYO) in based on th
3665X chip and will weigh 5.3 yound

#### Grudge match

by Company's promise to go low end is generating hig reaction at some clone makers. For instance, AST Re Tom Yuen, co-founder and COO, felt compelled to cir memo last week to some firm executives. While the ti we heard, it spoke of challenge: Company w. AST.

On use recovering 

At Microroft's application direction briefing last week, Senior Vice President Milite Magles was dutifully running down all
the reasons why his company should team up with DEC — its
position as a leader in office systems and its extensive service
and support network, amang others. Strangely, he forget to
include the most obvious one: it mit 1884.

here of the attendance in the IRIA has not Complexed Court, For Communication States and manifest Africa of Complexed Court, For Court of Complexed Court, For Court of Court





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